SAFETY NEWS

A NATIONAL SAFETY COUNCIL PUBLICATION

1958

22nd ANNUAL SAFETY EQUIPMENT ISSUE

MARCH 1958

SECTION	DATA
1	PLANT DESIGN AND CONSTRUCTION
2	HOUSEKEEPING AND MAINTENANCE
3	INDUSTRIAL HEALTH ENGINEERING
4	NOISE CONTROL
5	PERSONAL PROTECTION—PART 1
6	PERSONAL PROTECTION—PART 2
7	MATERIALS HANDLING
8	MACHINE OPERATION AND GUARDING
9	PLANT PROTECTION
10	MEDICAL AND HEALTH SERVICE
11	SAFETY PROMOTION AND TRAINING
12	PRODUCT AND SOURCE DIRECTORIES

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201 North Braddock Avenue
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22nd Annual Safety Equipment Issue

National Safety Council

Chartered by the Congress of the United States

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NATIONAL SAFETY NEWS is published monthly by National Safety Council. Copyright 1958 by National Safety Council. Printed in U. S. A. Entered as second class matter June 21, 1921, at the Post Office at Chicago, Illinois, under the act of March 3, 1879. Subscription rate: $6.50 a year. Single copies $1.00. All prices subject to 10 per cent discount to National Safety Council members. Quantity prices for yearly subscriptions and single issues on request. Member Audit Bureau of Circulation.

37,100 copies of this issue were printed

National SAFETY NEWS

A NATIONAL SAFETY COUNCIL PUBLICATION

Vol. 77, No. 3 **MARCH 1958**

See also index on page 274

1. **PLANT DESIGN AND CONSTRUCTION**
Design for Safety; Floors That Can Take It; Lighting the Plant; Stairs, Ramps, Fixed Ladders 15

2. **HOUSEKEEPING AND MAINTENANCE**
Housekeeping, Sanitation; Color; Portable Ladders; Scaffolds.. 27

3. **INDUSTRIAL HEALTH ENGINEERING**
Washrooms and Lockers; Industrial Ventilation; Skin Infections; Safety with Solvents; Heat and Humidity; Drinking Water; Food Service 47

4. **NOISE CONTROL**
Engineering and Medical Control; What Type of Noise; Getting Them to Wear Ear Protection; Hearing Aids 77

5. **PERSONAL PROTECTION—PART 1**
Eye, Respiratory and Head Protection 91

6. **PERSONAL PROTECTION—PART 2**
Men's Furnishings; Foot Protection; Protective Clothing; Hands and Arms; Leg Protection; Safety Belts 133

7. **MATERIALS HANDLING**
Analyze Materials Handling; Trucks and Tractors; Hoisting Equipment; Conveyors; Wire Rope and Slings; Chain and Slings; Fiber Rope; Aids to Manual Handling 179

8. **MACHINE OPERATION AND GUARDING**
Guarding the Machine; Electrical Equipment; Tools 199

9. **PLANT PROTECTION**
Fire-Fighting Methods; Portable Extinguishers; Automatic Protection; Training Fire Fighters; Flammable Liquids; Static Electricity; Spontaneous Ignition 215

10. **MEDICAL AND HEALTH SERVICE**
Medical Service; Care of Injured; Resuscitation 245

11. **SAFETY PROMOTION AND TRAINING**
Training and Maintaining Interest; Signs for Instruction, Direction and Warning; Planning Effective Meetings 259

12. **PRODUCT AND SOURCE DIRECTORIES**
Directory of Safety Equipment Sources; Classified Product Index; Advertisers' Index 281

Distributing Safety Equipment .. 3
Max Again (Diary of a Safety Engineer)—*Bill Andrews* 4
Fewer Fatalities in 1957 6
Wire from Washington 7
Ionizing Radiations 8
Capacitors—*Data Sheet D-404* ... 9
Safety Library 160
Safety Posters 278

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EDITORIAL

Investment in Protection

IN EVERY up-to-date plant, safety equipment adds up to a sizable investment. Yet in proportion to the value of life and property protected, it represents a very small outlay.

The field of safety equipment covers a lot of territory. It has come to include all products and services which safeguard the health and comfort of the employee as well as those which protect him from accidental injury.

A clean, orderly, well-guarded plant, with personal protective equipment worn where needed, does more than protect employees against immediate hazards. It reminds them that the safety program is not just talk.

This Annual Safety Equipment Issue—our twenty-second—has been planned to help readers in the purchasing, use, and maintenance of equipment—to help them get value from their investment in protection.

Preventing accidents is an all-year job, with no vacation. We suggest, therefore, that you keep this to serve as a purchasing guide. In addition to the product information in Sections 1 to 11, you will find much helpful information in the classified lists in Section 12—and in the advertisements, too.

This issue, of course, cannot take the place of more detailed works, such as the National Safety Council's *Accident Prevention Manual for Industrial Operations*. That book might be compared to an unabridged dictionary while this issue is more like a desk edition. The emphasis here, of course, is on the products and services used for both physical protection and safety communication.

And for more specialized information there are the publications of the American Standards Association, U. S. Department of Labor, National Fire Protection Association, and many professional and technical associations.

And don't forget the manuals and catalogs of many manufacturers. They rate a place in the safety man's library, too.

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EMPLOYEE at Humble Oil & Refining Company gets outfitted at company's central supply store.

Distributing Equipment

. . . and getting it used

THE PAIR of goggles over a grinding wheel for all hands to use is in the same class as the common drinking cup and the old roller towel. It isn't found in the modern factory.

Many companies have found that employees accept and wear protective equipment more readily if comfortable equipment is individually furnished and kept clean.

It is simple enough to decide that employees should be provided with protective equipment. It becomes more complicated in plants with diversified operations and no very clear standards of protection for the various jobs. A chemical plant furnishes an example.

Approaching the Problem

First, make a comprehensive survey of the plant. This should establish the requirements of each department. Watch changes in operating conditions and other variable factors. These will result in new requirements.

After establishing requirements for protective equipment, present the facts to supervision and to the man on the job. Here is a suggested approach:

1. Specify equipment for an entire area. For example, anyone entering an acid manufacturing plant must wear chemical-type goggles, or all persons working in warehouses must wear safety shoes.

2. List required equipment for general categories, such as wearing rubber or plastic gloves and splash-proof goggles for all acid-handling operations.

3. Where a large number of potentially hazardous materials may be handled infrequently, establish a schedule with specific requirements for each category of materials. Code orders so that the supervisor can refer to the schedule and make sure that all persons are adequately protected.

Don't Overprotect. This procedure is particularly desirable where the hazardous properties of chemicals vary widely. Requiring employees to be overprotected when handling harmless materials has a bad effect on morale.

Most operations in chemical plants should be surveyed and a combination of the above steps utilized. Employees should be instructed as to the precise equipment required during the various stages of operations.

Standardize Items

A list of approved equipment for various operations should be

—To page 90

(Fiction)

"With ladders, with fire extinguishers, with anything having to do with people's lives, you can't depend on tests alone, you have to trust . . ." That's the thought that Max, the veteran salesman, left with our Safety Engineer. And then the bargain ladders from an unknown supplier didn't look so good.

MAX AGAIN

By BILL ANDREWS

March 10, 1958

MAX, MY old friend and safety equipment salesman, made a visit to the Project this week, and he doesn't like it. He's 5 feet, 4 inches tall and weighs 180, and a scattered set of operations such as we have on the Project is hard on his feet and his wind.

Also, in its half-constructed state, it is treacherous walking, for the snow has masked the roughness of the torn ground but has not smoothed out the footing.

So, sitting in my office after our tour, with his shoes off and his fat cigar alight, he said, "This is not for old men like me. Heart attacks I will get and for what? For a miserable dribble of orders. If you stay here, I think I will get in my line some war surplus mats for making airfields in mud, nice little square mile lots of flexible metal to keep your feet dry and make me rich. But if I did, that bum, Smith, would go and get it in quarter-mile lots and sell it to you for bargains. There is no justice!"

I told him my heart bled for him. "But what's really bothering you is fresh air. You can't stand it. I've seen you do fifteen miles in a day on concrete floor, rough block in foundries, steel grids on catwalks. And you're always complaining that your feet hurt, but you walk the feet off me anyway."

"Who makes any money outdoors," Max growled. "Nobody wants quality merchandise with a big mark-up when he's building and everything is a mess. He has to have a nice plant, a big volume, a lot bigger ideas. Then he thinks, 'This Max, now—a crook, a profiteer, but he does have nice merchandise. Maybe I will buy from him lots of shiny things that will look good when the president comes around, or my competitor.' That's when I make money, not selling to sharks like you who always want price *and* quality."

* * *

So, after the inevitable round of light-hearted sniping, we got down to business on my supply needs in the coming quarter. There were some goggles of assorted quality and type. Max doesn't mind the type variations —the sense behind that variety is obvious. But he always growls about the quality spread, and I tell him over again that I've got men well out of any normal eye hazard range for most of their work day, who can lose seldom-used goggles by the dozens a year. For them, plastic goggles of cheap make are good enough, and, since they're cheap, I can stock them generously around the plant. But a man working on or near eye-hazardous jobs must have the best that money can buy.

Then there were fire extinguishers—Max and I understand each other here, and all I had to do was list locations and types of operations in each and let him take it from there. He'll draft me a bill of materials, with prices, and I'll fight it through Purchasing.

My respirator needs are minimal right now, and my first aid supply requirements only slightly above normal. I've got a good deal of salvageable material from kits scattered out on construction jobs that can be put to work in plant kits as construction ends and operations begin.

I wanted quotations on rope and steel cable, and Max accepted the request sourly. I haven't given him any business in that line in five years, but I always have him check it for me. I don't suppose he has any real volume in that line, for I can always meet his quality and beat his price, but he's a good check on the two suppliers who are getting most of the business here.

We handled a few more routine items, and then I picked up the phone and called Corelli in purchasing. "What's the situation on those ladders for the Debartsey

unit?" I asked. Corelli was glowing. "I was just going to call you. Got a price that'll knock your eye out. About a third off your estimate."

I asked, "Who from?"

Corelli said, "A new outfit, out on the Coast. Name's Beden and MacGuire. They bid right to your specifications."

"I never heard of them," I said.

"Neither did I," said Corelli, "but I sent some inquiries out West, and one of the trade associations sent the inquiry on to them. They had a man here two weeks ago. Very nice guy."

"Have you checked up on them?" I asked.

"You bet I have. They have a good credit rating—remarkably good for a new outfit. And they've sold ladders to Leeson, and to Eventray. They say they're satisfied with them."

I asked how many ladders they had bought, and it turned out to be about 10 each, all in the last year. I wasn't too impressed to find they hadn't killed anybody.

Corelli then brought in his clincher. "I told them we didn't know their work, so they've sent a sample. Meet me down in the warehouse and I'll show it to you."

"Come on," I said to Max, "let's see you help me out with a creative selling job."

We found the ladder, a 20-foot straight type, laid out horizontally between two heavy benches. A couple of sandbags were placed on the ladder near the center, bowing it downward. Max and I looked at each other, saying nothing.

We looked the ladder over very carefully. It was made of good material, and the workmanship was excellent. "It's a very nice job," Max said. "Very nice. How much?" I introduced him to Corelli, and Corelli quoted the price. Max said, "It's a good price. You should have bought this one."

Corelli looked at Max the way most people do when they first meet him. He has a kind of fat innocence in his look, a kind of bland appearance of stupidity in his obvious questioning. As a result, Corelli was trapped into delivering himself of a kindergarten lesson. "We aren't, of course, worrying about a single ladder. This is just a sample. We're thinking about placing an order for several thousand dollars worth of ladders. Naturally, we didn't want to place the order until we were sure of the quality of the product."

Max looked grateful for the information. "That, of course, is different. The price is very good. But will the ladders be up to the quality of the sample?"

"I've been thinking about that," Corelli said. "That's why I set up this crude test on this ladder. Now, I'm no safety man, and I don't suppose this is an accurate test. But there must be good and accurate strength tests for ladders. Maybe like this one. Maybe different. But I think we should buy this firm's ladders and then, at least at first, strength-test every one of them. That way we get our price without any risk."

Max opened his mouth, shut it again, looked at me, at Corelli, and then discovered something of profound interest on the ceiling. That left it up to me, and I explained very patiently to Corelli that you simply do not strength-test ladders before use. I told him that such testing could itself be destructive, creating strains and weaknesses. I dramatized the point by telling him that I was condemning the ladder before us.

When I got all through, Corelli said, almost in a wail, "How do you buy ladders, then? How do you know what you're buying?"

Max came back into the conversation. "Mr. Corelli," he said, "I'm just a peddler. But I buy or tell people to buy many things, ladders among them. What I say you can't check, maybe, but your

—To page 174

WHAT EATS YOU?

MY PSYCHIATRIST says, "It isn't what you eat but what eats you, that gets you into trouble." For example:

Farnsworth remembered Arnheim trumping his ace—and got so excited he stumbled over a rake and broke his ankle.

Amy thought about Sally Jones snubbing her at the Women's Club tea—and drove through a stoplight hitting a bus.

Ainslee didn't get to chat with the boss at the office party—and whipped his 3-year old when he got home, for spilling his milk.

Joe got irritated waiting for his spouse to get dressed—and got a ticket for speeding.

Bill cussed his kid for running through the house and making noise—till he saw Ray push his boy in a wheelchair.

Jerry blew his stack as he made out his income tax report—then he saw a Hungarian refugee interviewed on TV.

Walt raved about the soft deal his boss had—then he got the job.

Al stomped out of the house after arguing with the Missus—then missed a curve and wrapped his car around a persimmon tree.

Sam fretted about his kid who was awake all night with a temperature—and got his arm caught in a drive belt.

Archie worried if Gus had more licks in for the promotion than he had—and goofed on a project, which hurt his chances.

Wadsworth figured no one else had brains enough to be delegated responsibility—till he went to the hospital to nurse an ulcer.

Tyrone was back in that parked car with a babe with big blue eyes—then he walked off the end of the loading dock.

Reginald thought he was God's own reincarnation of dignity and superiority—then he had to submit to an M.D. on the business end of a proctoscope.

When you check results, this cotton-pickin', chicken-pluckin' type of psychometrics does nothing—so why let such stomach rumblings throw you?

—ROBERT D. GIDEL

Fewer Fatalities in 1957

Decreases in manufacturing, agriculture, and trade more than offset increases in extractive and service industries

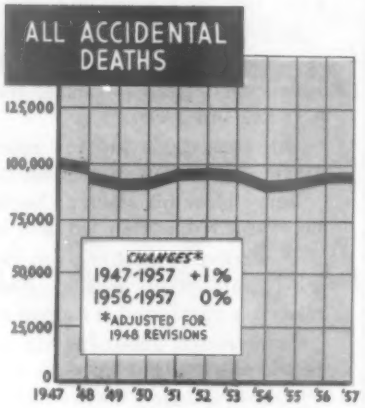
THERE were approximately 14,200 deaths from work accidents in 1957, or 100 fewer than in 1956. Decreases were recorded in 3 of the 8 principal industrial groups; increases in 2.

The death total for manufacturing was 1,900, or 100 fewer than in 1956. Fatalities in agriculture and trade also decreased 100 each to 3,500 and 1,300 respectively. In mining, quarrying, oil, and gas wells, deaths increased 100—from 800 to 900 and in service industries (including finance and government) fatalities also rose 100 to 2,500. For the other industrial groups the 1957 death totals were the same as in 1956: contract construction 2,600; transportation 1,300; public utilities 200.

Nonfatal injuries totaled nearly 1,950,000, or about 2 per cent less than in 1956. Permanent impairment cases numbered about 80,000.

Employment in all industries during 1957 was about 1 per cent more than in 1956, even though manufacturing employment went down almost 1 per cent.

Accident rates cannot be computed at this time on a national basis. Preliminary information indicates that the all-industry frequency rate probably was slightly lower than in 1956. Nonfatal injuries, as noted above, were fewer



than in 1956. Employment was up 1 per cent and average hours worked per week were down about 1 per cent resulting in approximately the same exposure as in 1956.

Accident Costs. Wage loss, medical expense, and the overhead costs of insurance for work accidents in 1957 amounted to about $1,950,000,000. The so-called "indirect" costs are estimated at $1,900,000,000. These include such items as time lost by workers other than the injured, time lost by workers whose injuries were not serious enough to be classified as temporary total disabilities, interference with production schedules, and property damage. Total costs were about $3,850,000,000.

Off-The-Job Accidents. In addition to the work accidents, the nation's productive capacity was lowered by off-the-job accidents of workers. The 1957 death toll from these accidents was approximately 32,300 and the injury total about 2,500,000. Accidents to workers, on and off the job, totaled 46,500 deaths and 4,450,000 injuries. The time lost during the year from these accidents, and from less serious injuries and indirect losses, amounted to approximately 295,000,000 man-days.

Fire Loss. The 1957 total of property destroyed by fire was $1,023,000,000, according to the National Board of Fire Underwriters. This was 3 per cent more than the comparable 1956 total. In 1956 nearly half of the loss from building fires was in industrial and business establishments.

Industrial Commission Records. Deaths reported to Industrial Commissions in 22 states during 1957 totaled 7,194 or 4 per cent more than in 1956. Increases of 1 to 35 per cent were recorded in 13 states, decreases of 2 to 13 per cent occurred in nine states.

	1957	1956	Per Cent Change
Totals for 22 states	7,194	6,927	+ 4
Alabama	119	96	+24
Arizona	83	72	+15
California	1,032	1,002	+ 3
Connecticut	67	57	+18
Florida	201	217	— 7
Georgia	221	169	+31
Idaho	74	84	—12
Illinois (11 mos.)	298	237	+26
Kentucky	85	87	— 2
Massachusetts	566	631	—10
Missouri	85	91	— 7
Nebraska	81	70	+16
New York	1,598	1,523	+ 5
North Carolina	158	117	+35
Oregon	129	147	—12
Pennsylvania	771	744	+ 4
South Carolina	85	84	+ 1
Texas	709	629	+13
Virginia	194	222	—13
Washington	215	238	—10
West Virginia	312	288	+ 8
Wisconsin	111	122	— 9

THE NATIONAL ACCIDENT FATALITY TOLL

	1957	1956	% Change
All Accidents	95,000	94,780	0
Motor-Vehicle	38,500	39,628	— 3
Public Non-Motor-Vehicle	18,000	16,000	+13
Home	27,500	28,000	— 2
Work	14,200	14,300	— 1

Note: The motor-vehicle totals include some deaths also included in work and home totals. This duplication amounted to about 3,300 deaths in 1956 and 3,200 in 1957. The 1956 all-accident and motor-vehicle death totals are the official figures of National Office of Vital Statistics; all others, National Safety Council estimates.

WIRE FROM WASHINGTON

By Harry N. Rosenfield
Washington Counsel, National Safety Council

INTEREST in safety continues to be shown in Presidential messages, in the Congress, in Executive establishments, and in the federal courts.

The President. In his Economic Report to the Congress, the President said that "efforts to develop and encourage adequate safety standards and to encourage safe practices should be intensified by state and local governments and by employers." The President said that "a special responsibility of the federal government in this area . . . could be discharged more fully if legislation were enacted enabling the Secretary of Labor to prescribe and enforce safety standards for longshoremen." The President recommended enactment of such a law. However, contrary to his messages to Congress last year [see "Wire," April 1957] the President did not recommend legislation providing grants-in-aid to states for occupational safety.

The President's budget message said: "prompt enactment of legislation controlling advertising on the interstate highway system is also recommended." Shortly after submitting this message to the Congress the President elaborated his views on the subject of billboard control in a letter to the president of the American Planning and Civic Association, as follows:

I am convinced that this activity must be controlled and regulated if the public is to have the safe driving conditions and surroundings contemplated by the high standards applicable to the Interstate System. While it is desirable that the control and regulation of outdoor advertising be left to the states, I believe that federal legislation on the subject is necessary to assure effective state action.

Industrial Safety. Pursuant to a program authorized last year [see "Wire," Oct. 1957], the Atomic Energy Commission announced that it will offer statutory indemnity to its major contractors, protecting them and the public against losses arising from nuclear accidents. In addition to covering accidents for which operating contractors are responsible, the AEC plan will also cover accidents for which all other persons, including subcontractors and suppliers, are responsible. The AEC also held an industrial conference with insurance representatives to discuss amendments to its temporary indemnity regulations. The amendments were designed to serve as a basis for calculating the financial protection required of persons licensed to operate a nuclear reactor.

The Secretary of Health, Education, and Welfare announced that a National Air Pollution Conference will be held in November, 1958, to study "the growing problem of air pollution in urban areas." This conference, which will take place at the half-way point in a five-year program of research and technical assistance [see "Wire," Aug. and Sept., 1955] is a concerted national effort to deal with air pollution. It will be chaired by the Surgeon General of the Public Health Service, and will bring together leading health authorities to consider medical, industrial and legal problems. Senator Kuchel (Calif.) said that it was especially necessary to deal with the effect of the automobile on air pollution.

The Interstate Commerce Commission reissued its rules concerning monthly reports of railroad accidents, with what it called only "minor changes" in coding.

The Chemical Industries Committee of the International Labor Organization held its 5th session in Geneva to discuss, among other things, the protection of workers against occupational diseases and poisoning. An advance report made detailed analysis of the effects on the human skin of chemical substances, by ingestion, inhalation, or absorption through the skin. The report emphasized that the first essential for the prevention of industrial diseases is the knowledge of the hazard.

Highway Safety. The Federal Highway Administrator released figures from a still unpublished study of accident causes, which indicate that on two highways of comparable average daily traffic (28,000 plus), the highway with planned, controlled access had an average accident cost of $19,000 per mile per year, as compared to $82,000 on the comparable highway without controlled access. The same official announced completion of grant negotiations with Northwestern University for a program of scientific research into the causes of accidents. A team approach will be applied to a series of case studies, investigating selected accidents on the immediate scene, and then following up with detailed explorations of all possible information as to the true causes of the accident. Other phases of the study will include (1) speed, horsepower, and driver attitude; (2) social and economic dimensions of highway accidents; and (3) an accident cost study.

The Air Force decided to con-

—To page 175

EQUIPPED to monitor hot areas. Engineer at General Electric's Hanford Atomic Operation displays new transistorized survey meter developed by G. E. engineers. It is lighter, more rugged, and less sensitive to temperature and humidity changes than the vacuum-tube instrument at right. Engineer is wearing radiation-sensitive badge and two pencil-shaped pocket meters, also special respirator. Freshly laundered garments are worn.

Ionizing Radiations

Varieties of radiation, types of injury and measures that provide protection

RADIOACTIVE MATERIALS are becoming increasingly important in industry and the sciences.

Sources of radiation range from a radon needle, not much larger than a common sewing needle, to a high-voltage x-ray machine weighing several tons and requiring a separate building to house the machine and its accessories.

The ionizing radiation may be:

1. Gamma ray from radium.
2. Alpha ray from polonium.
3. X-ray from a tube.
4. Alpha, beta, or gamma radiation or neutrons from radioisotopes (artificially produced sources).

All these types of radiation are capable of producing injury to the body.

X-rays, gamma rays, and cosmic radiation are electromagnetic phenomena similar to visible light but of higher frequency and therefore more penetrating. The other types are moving charged particles.

Injuries produced are qualitatively the same. There are quantitative differences due to differences in intensity and penetration.

Types of injury. Eight general types of injury from exposure to excessive amounts of radiation have been recognized:

1. X-ray dermatitis.
2. Induction of tumors.
3. Leukopenia.
4. Leukemia.
5. Anemia.
6. Bone necrosis.
7. Glandular dysfunction.
8. Fetal injury.

X-ray dermatitis is a common result of exposure to almost any radiation. It is characterized by rough, dry skin, wart-like growths, and dry, brittle nails.

Bone necrosis is very similar in form and in causation to the dermatitis. It has often been produced by overexposure to medical fluoroscopes, primarily through failure of radiologists to wear personal protection.

These types of injury are probably most commonly produced by local irradiation of tissue with a comparatively concentrated dosage.

The other types are more apt to be produced by whole body irradiation at low levels and for a long time. These conditions are apt to develop insidiously in industrial use and may be overlooked until serious harm has been done.

Leukemia is the most studied of these conditions. Radiation anemia due to damage to bone marrow has been studied closely as one of the results of whole body irradiation in atomic bomb blasts.

—To page 172

A NATIONAL SAFETY COUNCIL
TECHNICAL SERVICE

DATA SHEET D-404
(Revised)

CAPACITORS

Published by National Safety Council
425 North Michigan Avenue, Chicago 11

1. A modern industrial power capacitor is an electrostatic condenser device used to improve voltage regulation, to reduce line voltage drop, and to correct or improve the power factor.

Equipment

2. A capacitor unit consists of two aluminum foil strips or plates with thin, high-grade insulating paper placed between them. The strips or plates are compactly wound and connected in groups, each of which is connected to a terminal. The insulation paper, commonly referred to as the dielectric, is the working element of the capacitor.

3. There is no contact between the two metal surfaces. However, when these two surfaces are connected to a source of power, energy is stored in the dielectric. The capacitor will remain charged at or above full line voltage when disconnected from the source of power until a discharge path is provided between the terminals.

4. The modern capacitor has a built-in discharge resistor designed to drain off or reduce the residual charge, i.e., the absorbed charge which remains after the capacitor has been disconnected from the source of power and which may re-establish a dangerous voltage. The voltage remaining between terminals after five minutes may be eliminated by repeated short-circuiting of the bushing terminals until no arc is heard.

This Data Sheet is one of a series published by the National Safety Council, reflecting experience from many sources. Not every acceptable procedure is necessarily included. Data Sheets should not be confused with American Standard Safety Codes, federal laws, insurance requirements, state laws, rules and regulations, or municipal ordinances.

5. Discharge resistors should be capable of draining off the residual voltage within the time limits specified by the *National Electrical Code*, Article 460, Section 4605.*

**National Electrical Code*, 1956, National Board of Fire Underwriters, 85 John Street, New York 7, or American Standards Association, 70 East 45th Street, New York 17, N. Y.

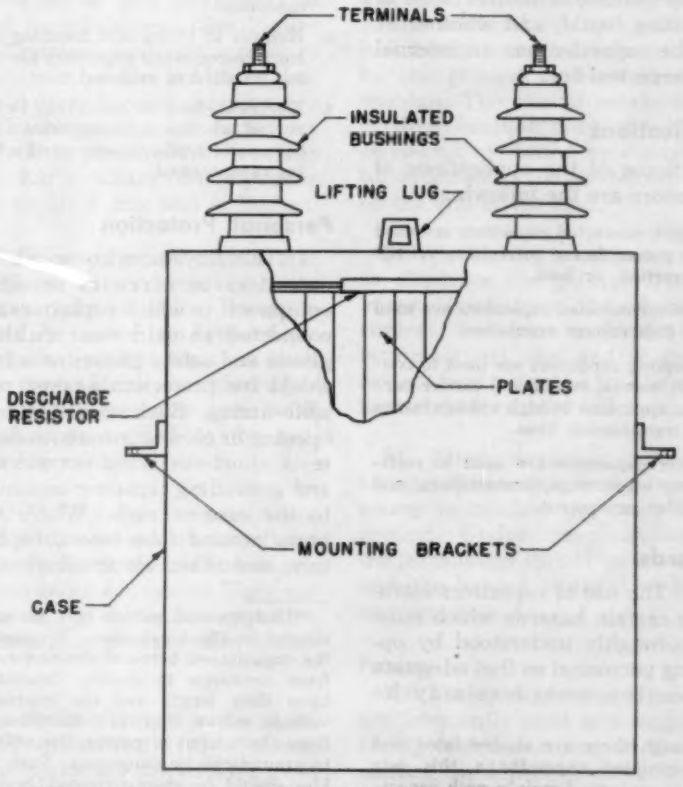


FIGURE 1. Cutaway section of a 2,400-volt, single-phase, 60-cycle unit. (Courtesy Consumers Public Power District, Columbus, Nebr.)

6. Since a built-in resistor has the disadvantage that it cannot be visually inspected for open circuit, it should not be relied upon for positive drain-off of the residual charge. In capacitors for AC service, reactance coils or potential transformers may be used for the same purpose and must meet the same code requirements.

7. The wound plates and discharge resistor of a capacitor are enclosed in a welded sheet steel case. The contents are vacuum dried and usually impregnated with oil or a nonflammable synthetic insulating liquid which fills the case.* The case is hermetically sealed to prevent entrance of moisture and leaking of the liquid. Terminals pass through the case in insulating bushings. The cases are supplied with mounting brackets. (See Figure 1.)

8. Capacitors are rated in accordance with their voltage, kva, or mf (microfarad capacity), and each capacitor carries a name plate showing the maker's name, rated voltage, cycles, phase, style, type or catalogue number, type of insulating liquid, and whether or not the capacitor has an internal discharge resistor.

Applications

9. Some of the applications of capacitors are the following:

a. Shunt connected capacitors are used for power factor correction, voltage correction, or both.

b. Series connected capacitors are used for line voltage regulation.

c. Coupling capacitors are used to connect meters, relays, and carrier current apparatus to high voltage busses or transmission lines.

d. Filter capacitors are used in rectifiers, wave traps, transmitters, and similar equipment.

Hazards

10. The use of capacitors introduces certain hazards which must be thoroughly understood by operating personnel so that adequate protective measures may be taken.** The principal hazards associated with capacitors are:

a. The stored energy of a disconnected capacitor may cause severe electrical shock or burns, or surprise shock which can result in injury.

b. An electric flash may occur when the terminals of a capacitor with a defective discharge resistor are short-circuited.

c. Excessive pressure within a case may cause it to rupture. If a swollen case has not ruptured, it may be advisable to puncture it before handling it.

d. There may be inadequate guarding or insufficient working space around capacitors.

e. Hazards of lifting and handling are encountered when capacitors are being installed or removed.

f. Electrical shock or burns may be incurred when a capacitor which has been accidentally de-energized is being re-energized.

CAUTION

When Work Is To Be Done on Capacitors

1. Open disconnects.
2. Wait five minutes, then,
3. Discharge capacitors by short-circuiting terminal to terminal a-n-d terminals to case, after which,
4. Ground terminals and case.
5. Remove grounds before re-energizing.

FIGURE 2. Typical caution sign for capacitors.

Personal Protection

11. Employees who work on capacitors or circuits or other equipment to which capacitors are connected should wear rubber gloves and safety glasses or a face shield for protection against possible arcing. Such work includes opening or closing cutouts, making tests, short-circuiting terminals, and grounding capacitor terminals to the case or rack. Where the areas around fuse boxes, capacitors, and other electrical apparatus are wet, wood platforms, insulated stools, or rubber boots should be used by workers.

General Precautions

12. Capacitors should conform to the requirements of recognized standards for design, application, and testing. Installations should be checked for compliance with the regulations of the American Standards Association and the *National Electrical Code* (Article 460).***

13. Special instructions of the manufacturer covering the switching and operation of capacitors should be carefully followed.

14. Before a defective capacitor unit is replaced, the voltage and other ratings of the new unit should be checked to make sure that they are correct for the installation.

15. Each capacitor installation should be screened to prevent anyone from walking into it, and a caution sign should be prominently displayed. (See Figure 2.) Adequate space should be provided around the capacitors so that the workmen can place and remove the screens safely, discharge and short-circuit the units, and otherwise work freely around the installation.

16. Ground-mounted high voltage units should be enclosed by a fence, and a warning sign calling attention to operating instructions should be placed on the gate.

17. Before capacitors are installed or removed or work is done on them, risers and other energized equipment in the immediate work area should be covered with rubber or other approved protective devices if such equipment cannot be disconnected.

18. Before work is done on a capacitor installation, regardless of its voltage, the fused cutouts or disconnecting switches should first be opened with a rapid, positive

*Though there are air-insulated and mica-insulated capacitors, this data sheet is concerned mainly with capacitors which are filled with a special insulating liquid.

**Underground cables may be considered in effect capacitors, because of the capacitance between conductors or from conductor to sheath. Depending upon their length and the impressed voltage, when they are disconnected from the source of power, the voltage to ground can be dangerous. Such cables should be short-circuited, bonded to the cable sheath, and grounded before any work is done on them.

***See *Standards for Capacitors*, American Institute of Electrical Engineers, No. 18; Standard C-55, American Standards Association, New York 17, N. Y.

action. Where a breaker is also provided, it should be opened first.

19. When capacitors are being removed from service, it must be remembered that time is required to dissipate the residual charge. Short-circuiting a disconnected capacitor for a moment will remove only the free charge, leaving an absorbed charge which may re-establish a dangerous voltage. A disconnected capacitor, therefore, must be considered live.

20. After disconnecting a capacitor, the employee should wait five minutes to allow time for the resistors to drain off the major portion of the residual charge. He should then short-circuit the capacitor terminals several times or until no arc is heard. A jumper or other approved device should be used for short-circuiting.

21. Each terminal should then be short-circuited to the capacitor case several times or until no arc is heard. The short-circuiting device should be left in place until the work is finished, but it must be removed from the capacitor before the unit is re-energized.

22. If a capacitor is not completely discharged, the degree of charge remaining will be indicated by the spark drawn and the accompanying report when the unit is short-circuited. If a capacitor still appears to be fully charged at the end of the five-minute interval, it should be checked for a defective discharge resistor.

23. During laboratory testing, the danger area should be roped off and the necessary danger signs installed. After completion of tests, the capacitor unit should be discharged and the terminals short-circuited by means of a small bare wire, which should remain in place.

Handling and Storing

24. When new capacitor units are received, they should be inspected thoroughly for external damage. Capacitors with broken bushings or leaking cases generally are not acceptable for use. Such capacitors should be repaired or replaced.

25. Undamaged units should be kept in their original packing cartons as long as possible, since the units are more conveniently handled by the hand holes provided in the cartons by most manufacturers than by their mounting brackets. Insurance carriers must of course be consulted if the cartons add to the fire hazard.

26. If capacitor units are to be stored temporarily, they should be placed in a location where they will not be subject to damage. The terminals of stored capacitors should not be short-circuited to keep the capacitors discharged.

27. Several manufacturers use metal bands to hold the capacitor blocking in place. Since these bands are under tension, suitable precautions should be observed when they are cut.

28. Individual capacitors weigh approximately 40 to 130 pounds. When handling them, employees should follow safe practices to avoid back injuries. (See Figure 3.) Terminal bushings appear to be obvious handles for lifting, but should *never* be used as such since the bushings of most capacitors are held in place only by a solder seal. Early failure of a capacitor may result if this seal is broken.

29. When capacitor units are to be placed in or removed from hanger racks on poles, the units should be raised or lowered by means that protect the case, such as a rope. Many manufacturers now provide capacitor cases with lifting loops welded to the top. (See Figure 1.)

30. Many capacitor units are filled with nonexplosive, nonflammable synthetic liquids known under various trade names. They are nontoxic, but continuous exposure to them may produce skin irritation.

31. Spilled liquid should be wiped up immediately because these liquids are solvents for most paints and because spillage creates a fall hazard.

FIGURE 3. Capacitors should be lifted by their mounting brackets or case—not by their insulated bushings.

Grounding of Cases

32. The cases of all capacitors, including pole-mounted types, should be permanently grounded. The case of single-bushing units is one terminal of the capacitor, and should be connected to ground by the ground stud attached to the case. The case of two-bushing or three-bushing units should be connected to ground by a conductor attached at the hold-down lug on the end of the case.

33. Grounding is recommended to eliminate the possibility of minor shock from the charging current between capacitor-line terminals and case and to guard against line potential on the case in the event of unit failure.

34. Where capacitor units are connected in series, it may be necessary to insulate the cases from ground. Under these conditions, the installation should be screened and the hazard indicated by a warning sign.

Fusing

35. Enclosed porcelain cutouts are frequently used as a means of fusing and connecting or disconnecting the source of power to capacitors. If fuses frequently blow at one capacitor bank, a search

should be made for indications of damaged capacitors, such as swollen cases or oil leaks about the bushings. Should the blowing of fuses persist and no defective unit be found, the trouble may be due to other causes.

36. Before a fuse larger than that rated for the installation is used, the trouble should be brought to the attention of the proper authority. Since gases from an internal arc can rupture a capacitor case, the installation should not be overfused.

37. Before the cutouts are closed after a bank has been refused, the installation should be examined carefully for signs of failure of capacitors or possible shorts from terminal to ground caused by birds, etc. Care should be taken not to close into a fault.

Repairing Line Breaks

38. Some electrical workmen express concern about doing routine work on lines equipped with capacitor banks, but there is no cause for undue alarm if the usual precautions for working on lines are observed.

39. Capacitor banks are in some ways like a transformer bank. If one phase wire breaks and the other two phase wires remain energized, the broken conductor beyond the break could be energized through the capacitor the same as in a three-phase transformer bank. (See Figure 4.)

40. If repairs are to be made while lines are energized, such conductor breaks should be handled in the usual manner for hot line work. If a line break is to be repaired with the line de-energized, then grounding sets or devices should be employed in the approved manner.

41. Grounding of the line will discharge any capacitors on the circuit beyond the grounding device. When a capacitor remains connected to the line and the power source is interrupted by some other means, the capacitor will be discharged by the built-in discharge resistor and also through transformers, regulators, or other devices connected across the line. (See Figure 5.)

Shunt Capacitors

42. Pole-mounted shunt capacitor units are usually connected to the line through fuse cutouts in the same manner as are the primaries of a transformer. Large banks of shunt capacitors used in stations or industrial plants will usually be protected by circuit breakers with individual fuses on each capacitor unit.

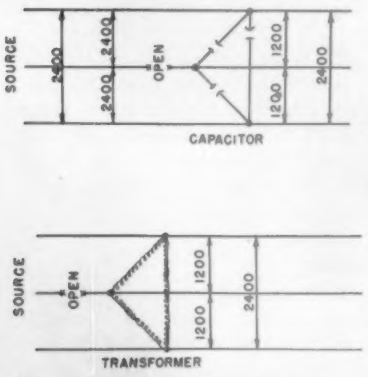


FIGURE 4. Diagram of typical capacitor and transformer currents.

43. On low voltage (550 v) industrial installations of shunt capacitor banks, just as on high voltage installations, the provision of disconnecting switches is desirable, so that the units can conveniently be removed from service.

44. When a clamp-on type ammeter is used for testing, the test should be made on the capacitor side of the disconnecting device. Where possible, individual capacitor currents should be read; otherwise, phase currents should be read. If the reading varies more than 10 per cent from the rated phase current for the capacitor bank under test, then in all probability one or more units in that phase have failed. If 0 current is indicated, all units in that phase are open or the fuse has blown. The fuse should not be replaced until all units in the bank have been inspected to determine the cause for the blown fuse.

45. On high voltage capacitors, the ammeter should be used on the end of a "hot stick." It is good practice to record the readings as they are taken.

46. Proper servicing should include periodic checks of the installation, at intervals determined by the circumstances, to see that it is operating satisfactorily. If the installation is on a pole and indicating cutouts are used, these checks may be visual and limited to an examination from the ground for blown fuses, broken bushings, debris, birds' nests, or bulged tanks.

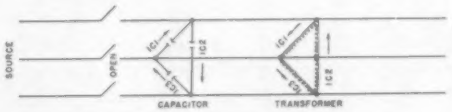


FIGURE 5. Discharging capacitors.

Series Capacitors

47. Series capacitors are physically similar to shunt capacitors except that they are connected in series with the line conductors, without fuse cutout protection. In order to secure continuity of service, should a capacitor unit burn open internally, a protective unit is installed. This protector automatically short-circuits a unit when an excessive voltage is built up across its terminals. Hence, frequent inspections are required.

48. To permit isolation of transmission line series capacitors without interruption of the power supply, each unit should be provided with a by-pass switch together with line and load side disconnects.

49. To allow adequate provision for de-energizing series capacitors, facilities for grounding both line and load terminals are required. An alternative arrangement is to ground one terminal and short-circuit both terminals. The grounds must not be applied until the by-pass switch has been closed and the line and load side disconnects opened.

Fixed Capacitors

50. To isolate or de-energize a fixed (unswitched) capacitor installation, the fused cutouts or disconnecting switches should be opened with a rapid, positive action. Otherwise, portable switch gear should be used. The ability to open the interrupting device quickly depends somewhat on the experience and technique of the operator.

51. It is recommended that special load-break cutouts or other commercially available devices be used to confine heavy interrupting arcing of large capacitor banks which would otherwise be too great for conventional methods of disconnecting.

52. To illustrate, a bank of capacitors is connected to a 2,400-volt system. (See Figure 6.) The capacitor current leads the voltage by 90 degrees. The opening of the cutout is started somewhere between points A and B on the curve. The arc will not break initially until point B is reached when the current becomes 0. The voltage left on the capacitor at that point will be the peak or crest voltage of the system or approximately 3,395 volts. At that instant, the voltage between the two open contacts of the cutout is 0, but the system voltage which is on one contact continues through 0 to a peak of opposite polarity. At point C, the voltage across both the cutout terminal contacts is then near 6,790 volts.

53. If the distance between the contacts is not sufficient, re-striking of the arc could occur. Should the arc re-strike or be re-established and maintained with the cutout open, the cutout should be reclosed at once to avoid damage to the cutout, and another attempt should be made to open the cutout.

54. After the fused cutouts or disconnecting switches have been opened, the capacitor installation is isolated but still charged. The capacitors should be left open from the line for at least five minutes before they are returned to service. This precaution will prevent a build-up of the line voltage

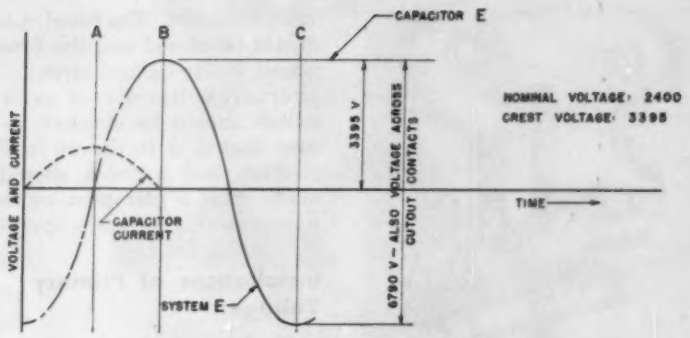


FIGURE 6. Chart of current while breaking load.

above normal, as might occur if a fully charged capacitor were closed to a line.

55. To discharge the capacitors, the capacitor installation should be grounded by means of the approved procedure, attaching to ground first, and then to the phases and equipment.

56. To return the capacitor installation to service, the grounding clamps should be removed from the load side of the switches. The grounding clamp should then be removed from the grounded spacing bolt, and the grounding cluster lowered from the pole. The live line clamps should be replaced on the line conductors if they were removed for work, and the fused cutouts should be closed.

57. When work is to be done on a pole-mounted capacitor or any associated equipment on the pole, the capacitor should be isolated (de-energized) and discharged. When work is required on the capacitor fused cutouts, the live line clamps should be removed from the line after the capacitor has been discharged.

Switched Capacitors

58. Precautions for safe handling of switched capacitor banks are the same as those for fixed banks except for the special considerations discussed in the following paragraphs.

59. To take a switched capacitor bank out of service, the control box should be opened and the control lever should be placed in the "off" position. As the lever is being moved, the oil switches may be heard to open. Throwing the lever should disconnect the capacitors on the line. To make certain that they are disconnected, however, the fuse should be removed from the control circuit.

60. With a switch stick, the operating handle of each oil switch should be checked, to make sure that it is in the down or "open" position. The fused cutouts can then be opened with no arc to interrupt. The capacitor bank is now isolated but still charged.

61. After the capacitors have been isolated, they should be left open from the line for at least five minutes before they are returned to service, to prevent a build-up of the line voltage above normal.

62. Hot line clamps are frequently used on switched capacitor mountings to disconnect the risers from the line while work is being done on the capacitors or while switches are receiving periodic servicing. The usual precautions for work on primary current transformers should be observed when the CT on the switched capacitor control circuit is being serviced.

63. To discharge switched capacitors, first the ground clamp of a grounding cluster should be attached to a permanent ground, if one is available, or to a driven ground rod. The grounding cluster should be secured to the pole, and, by means of an operating stick, one of the line clamps should be attached to the neutral ground stud on the back of the

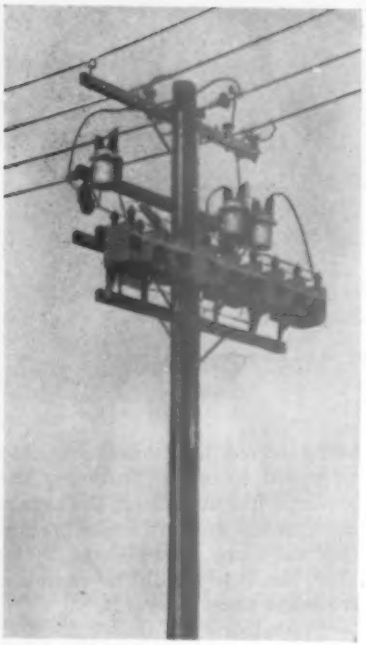


FIGURE 7. Pole-mounted, 3-phase, switched capacitor assembly. (Courtesy Consumers Public Power District, Columbus, Nebr.)

kick arm. Figure 7 shows a pole-mounted, 3-phase, switched capacitor assembly.

64. Next, the remaining line clamps should be attached to the phase busses on the load side of the oil switches. Some sparking will usually result when a ground clamp contacts the copper bus. When the three capacitor busses are grounded, the capacitors will be grounded and discharged and work may be safely carried out on the capacitors.

65. If the capacitor cases or hanger racks are not grounded, a jumper should be fastened between the grounding cluster and the cases or hanger racks. Figure 8 shows a section of outdoor, metal-clad, racked and switched capacitor installation.

66. To return switched capacitors to service, the grounding clamps should be removed from the capacitor busses, the clamp removed from the ground stud, and the grounding cluster lowered from the pole. Live line jumpers should be reconnected to the line if they were previously removed. The fused cutouts should be closed and the fuse replaced in the control circuit. The operating handle of each oil switch should be checked to ensure that it is in the up or "on" position, and a check should be made with a clamp-on ammeter to be sure the switch is operating.

Installations at Primary Voltage

67. In general, capacitor installations at primary voltage may be in one of two classes. In one class, the capacitors are isolated from other distribution equipment. In the other class, they are connected in parallel with the primary windings of distribution transformers on the load side of the transformer cutout.

68. Overcurrent protection is provided for a separate capacitor installation when the size of the fuses used does not exceed that rated for the installation. Then, in case of failure, the short circuit stresses in the individual capacitor units will be limited to safe values.

69. For surge protection on uni-grounded "Y" feeders, phase and neutral arresters or gaps of kv rating specified for the voltage rating of the feeder should be installed. On multi-grounded or delta feeders, phase arresters only are required.

70. On all installations, the capacitor mounting rack should be connected to the arrester grounding conductor by readily accessible disconnecting facilities. The arresters should be connected to the line side of the cutout in all cases.

71. On separate capacitor installations, appreciable arcing may occur when the circuit is opened, the magnitude of which is dependent upon the point of the current wave at which the switch blades open. Workers should be instructed to close the circuit immediately when heavy arcing occurs and then reopen it.

72. On capacitor installations in conjunction with distribution transformers, overcurrent protection is provided through use of the same fuse for the transformer and capacitor. Fusing will vary for combinations of transformer sizes and kva rating of capacitors.

73. For surge protection, the lightning arresters normally used with the transformer will suffice. They should be connected to the line side of the cutout in all cases, and the capacitor mounting frame

—To page 177

FIGURE 8. Section of outdoor, metal-clad, racked and switched capacitor installation. (Courtesy Consumers Public Power District, Columbus, Nebr.)

IN SECTION 1:

Design for Safety 17
Floors That Can Take It 19
Lighting the Plant 20
Stairs, Ramps, and Fixed Ladders 25

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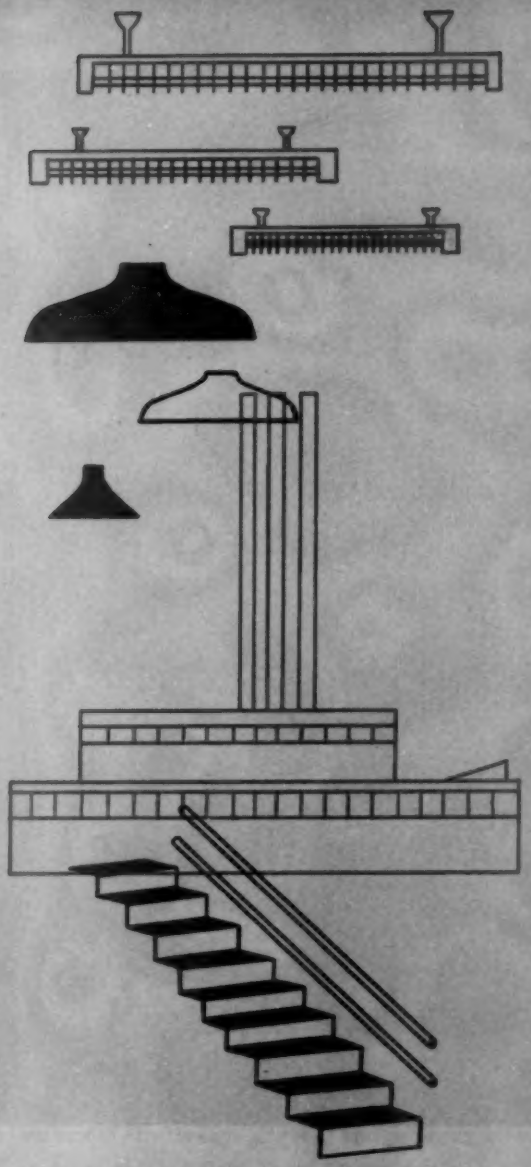
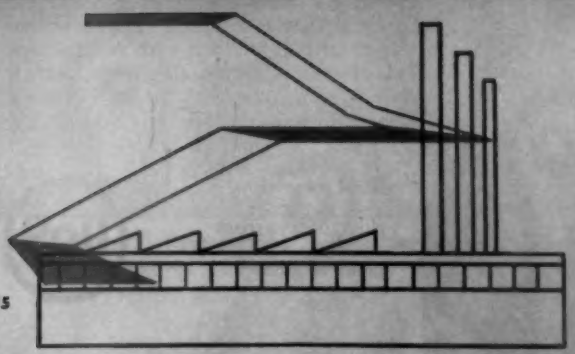


PLAN your plant for people. Arrange buildings, work facilities, and personal service facilities around the needs, capacities, and limitations of the worker. Automation is not likely to make this principle obsolete.

Industrial engineering plans the efficient use of equipment and human skills—without undue hazard or strain on the worker.

Preplanning an entire plant, remodeling buildings, and revising processes all offer opportunities for greater built-in safety and a hygienic work environment.

PLANT DESIGN and CONSTRUCTION



"Take a tip from me—

One slip can cost more than USS Multigrip"

Have you safe-treaded *all* the danger spots in your plant and on your moving equipment? Accidents may be costly—but they can be prevented. The safe tread offered by USS Multigrip Floor Plate provides positive traction in any direction.

Multigrip is studded with hundreds of little cleats shaped like those on a football player's shoe. They are flat on top—comfortable to walk on—and safe, wet or dry.

Not only does Multigrip protect workers, but it protects floor surfaces, too. It is rugged, heavy-duty steel plate that will last for years with no maintenance. It's easy to keep clean. A quick "once over" with broom or hose will get it spick and span; there are no closed pockets to hold dirt, and water drains quickly in any direction. Get Multigrip from our local distributor near you.

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USS **United States Steel**

Design for Safety

Building a new plant?
Remodeling your old one?
Installing new machines or rearranging layout?

. . . Then be sure safety has a part in the plans

A PLANT properly designed and laid out will offer fewer opportunities for accident, fire, or occupational disease.

In designing and building a safe plant there are many sources of help. First of all, there are the architects and builders, many of whom have had considerable experience in designing industrial structures and are familiar with operating requirements and the various codes.

Plans should be approved by state and municipal authorities before construction starts. Changes in finished buildings are expensive.

Compliance with local regulations, however, is not always a guarantee of safety. While some city codes are unduly restrictive, others are lax and out of date. New processes are introduced so rapidly that authorities are not always able to keep up with them.

The company's safety and medical staffs should also check the plans. They know the plant's problems and will have the responsibility of keeping workers safe and healthy in the new surroundings.

Remodeling. Most industrial buildings in the United States are more than 25 years old and lack the advantages of newer plants. Often much can be done to improve older structures.

An extensive remodeling job is usually undertaken to increase operating efficiency. However, many less ambitious projects can be initiated in the interests of safety and health. Layout, ventilation, lighting, sanitary facilities, and materials handling methods can often be improved at a cost considerably less than the benefits.

Visualizing the plans. In planning the layout it helps to picture the finished plants through visual aids. These range from blueprints to a complete miniature plant on a table top. Common aids are:

1. Blueprints, maps, and drawings.
2. Block templates and 2-dimensional templates.
3. Scale models ¼-in. to the foot. These give a 3-dimensional picture of the plant. Processes can be studied and layout changed. Simple scale models can be made in the plant; more elaborate ones can be purchased.

General Factors

The site. Location often is dictated by manufacturing processes. Fire and explosion hazards demand isolation. Smoke, fumes, dust, odors, and noise are other reasons for banning an industry from some neighborhoods.

Adequate outdoor storage should be provided. For flammable and explosive materials, specified minimum distances between storage areas and other property must be maintained.

Minimum distances between buildings of various types, sizes, and occupancies are specified by fire-protection codes.

Coal and other bulky materials require considerable storage space. In some industries, disposal of solid wastes may create a problem.

Employee transportation. Industry's continued movement to outlying locations creates transportation problems, particularly where transit service is inadequate. The problem is particularly troublesome for night shifts. Tardiness, absenteeism and labor turnover increase with difficulty in getting to and from work.

Some companies operate private buses, either free or at a low fare.

Many employees use car pools.

A new plant's effect on traffic and parking should be considered. An otherwise unobjectionable industry may be unwelcome because of added congestion and hazard.

Topography. Ground may be high or low, level or sloping, dry, swampy, or undermined. These factors affect plans. Normal drainage or possibility of floods or washouts during heavy rains also must be considered.

Where flooding is possible, multistoried buildings have advantages. Upper stories provide a place to which valuable equipment and products may be moved.

AMPLE, convenient off-street parking facilities for employees, customers, and visitors are important in selecting a plant site (Diamond Alkali Co.)

A PLANT IS ALL OF THESE . . .

Check them in the planning stage

1. Site:
   - Topography
   - Drainage
   - Room for expansion
   - Zoning restrictions
2. Transportation facilities:
   - Docks and wharves
   - Railroad
   - Highways and plant roadways
   - Mass transportation for employees
3. Exits and other wall openings
4. Walkways: floors, stairs, ramps, platforms
5. Storage facilities:
   - Flammable and explosive materials
   - Toxic substances
   - Raw materials
   - Finished products
   - Yard storage
6. Electric wiring and installation
7. Illumination
8. Materials handling equipment:
   - Cranes
   - Conveyors
   - Industrial trucks—power and hand
9. Elevators
10. Boilers and other pressure equipment
11. Ventilation, dust control, air conditioning
12. Fire protection
13. Noise and vibration control
14. Health and Safety:
    - Water—for drinking and sanitary uses
    - Waste disposal
    - Medical and first aid service
    - Personal protective equipment—distribution and repair facilities
15. Personal service facilities:
    - Parking
    - Washrooms and lockers
    - Food Service
    - Employment offices
    - Training programs

These subjects are discussed in greater detail in other sections of this issue.

Waste disposal. Sewers should not be located where leakage might contaminate water sources. Some waste materials must be treated before they are discharged into streams or otherwise disposed of. In other instances, special sewerage systems may be needed.

Disposal of radioactive wastes brings specialized problems. Instructions of the U.S. Atomic Energy Commission must be followed.

Enough manholes or other openings for maintenance should be provided in sewerage systems.

Climate. In colder regions, ice and snow removal are problems. Keeping the plant warm while removing air contaminants may make ventilation complicated and expensive.

In hotter areas, heat and humidity, often increased by manufacturing processes, will cause fatigue, low output, and heat exhaustion. Many industries air-condition for comfort, as well as for the product.

In warm, dry climates, some materials may be stored outdoors. In cold regions and those with heavy rainfall, covered storage may be necessary.

Roof loads of ice and snow and strong winds affect building design. Where hurricane-like storms are frequent, roof anchorage is important.

Data regarding windstorms and lightning in various regions are available from insurance companies. No area can be regarded as entirely safe from these hazards.

Protective lighting safeguards life and property, particularly in emergencies.

Fences high enough and strong enough to deter trespassers also are valuable in plant protection.

Entrances and exits. Where possible, rail, highway truck, industrial truck, and pedestrian traffic should be separated. If im-

—To page 122

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—Floors, Slippery; Data Sheet D-286.

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Floors That Can Take It

How to keep down hazards and costs

EVEN with normal use, a factory floor takes a lot of punishment day after day. And too often the floors get a lot of abuse and neglect.

Ask a safety man what he expects in a floor and he would probably stress three points: It must stand up under traffic without excessive maintenance costs, it must be easy to keep clean, and should provide a sure footing. Sometimes a compromise may be necessary.

First of all, the floor must be of adequate structural strength, particularly in multi-story buildings. Then the surface material should be selected for operating and traffic conditions. There is a wide choice of materials available.

When installing new floors or replacing old ones, here is a suggested procedure:

1. Divide the plant into areas. List type of service in each. If the floor is subjected to more than one type of use, add another classification.

Here are some typical areas: Aisles, storage areas, work places, heavy machine areas, loading docks, assembly areas, corridors, offices, rest rooms, cafeterias, laboratories.

2. Check service requirements. How many of these conditions apply to each area?

Size of area. What would the job cost?

Traffic. What is type and volume? Is it chiefly pedestrian or vehicle? Is resistance to slipping vital? What aisle widths and clearances will be needed?

Loads. What type of load—standing, impact, rolling, sliding, or vibrating? What will be maximum weight and concentration?

Water. Will floor be subjected to standing water, humidity, condensation, hot water, or steam?

Temperature. Will there be exposure to excessive heat or cold that might cause deterioration of some flooring materials?

Weather. Is there exposure to strong sunlight, freezing temperatures, snow, ice, or rain?

Fire and explosion hazards. Are there flammable dusts or vapors that could be ignited by a spark? Is an electrically-conductive, nonsparking floor indicated?

Chemicals. Will there be spills of solvents, acids, alkalis, or grease?

Product cleanliness. Are there food processing or precision machining operations that demand floors that will not collect dust or dirt?

Appearance. Is the location one where appearance is a primary consideration?

Maintenance. Will the area demand vigorous cleaning?

3. Where to get information. Much research on floor problems has been conducted by government agencies, trade associations, manufacturers and independent laboratories. Among sources of information are:

National Bureau of Standards.

Floor associations—Asphalt Institute, Asphalt Tile Institute, Maple Flooring Manufacturers Assn., Oxychloride Cement Assn., Portland Cement Assn., and Tile Manufacturers Assn.

—*To page 24*

COMMON FLOORING MATERIALS FOR INDUSTRIAL USES

AREA	Concrete	Asphalt hot mastic	Asphalt emulsion	Wood block	Wood plank	Asphalt tile*	Greaseproof asphalt tile	Resin binder mastic	Linoleum*	Terrazzo	Rubber tile*	Ceramic tile*	Vinyl tile*	Metal plates	Grating
Floors on grade	x		x	x	x	x							x		
Floors below grade	x		x			x	x								
Suspended floors			x		x	x	x	x	x	x	x	x			x
Driveways	x	x	x												
Ramps and loading docks	x		x	x											
Manufacturing areas	x		x	x				x							
Warehouses	x		x	x											
Stair treads	x					x			x	x			x	x	x
Offices						x			x		x		x		
Laboratories						x	x		x	x	x		x		
Cafeterias							x		x				x		
Washrooms	x					x				x	x	x	x		
Food processing	x						x					x			
Corridors	x								x	x			x		
Platforms, catwalks					x									x	x

**Also available in electrically conductive grades for explosion-hazardous areas*

Lighting the Plant

For Sight, Safety, and Production

SHIELDED FLUORESCENT lights provide glareless light for gathering machines in bindery. Note also acoustical ceilings, bumper block, and rail guards.

BRIGHT, non-glaring light is of first importance in any factory. When more than one shift works with the same machines and materials the same levels of light should be maintained day and night.

Even during the daylight hours, the sun will not always furnish adequate light over all work areas in a building. Fortunately, with modern light sources and installations, it is not necessary to depend on daylight.

What Is Good Lighting? If the eye is to function effectively, the system must be planned to:

1. Provide adequate brightness at the work surface. The worker must see easily and accurately without strain and undue fatigue.
2. Minimize contrast, glare, and shadows.
3. Supply light of right quality for quick and accurate judging of details.
4. Contribute a pleasing atmosphere to the workplace. Don't underestimate this factor.

Use of Color. Color, applied through the medium of paint, increases the effectiveness of any lighting system. Color expertly used conserves light, reduces harsh contrasts and acts as a psychological tonic to employees.

Seeing Zones. Two zones in the work room must be considered in providing light.

The task zone is the job and its immediate surroundings. Work should be lighted adequately, shadows eliminated or diffused, and reflections from surrounding surfaces avoided.

The other zone is the rest of the room. A person looking up from work should not face glare from lighting fixtures or a bright wall or ceiling. Adapting eyes from light to darkness several hundred times a day is fatiguing.

If the surrounding area has a brightness at least one-third that of the task, visual conditions are reasonably good. Surroundings should never be brighter than the work zone.

Glare can be reduced by higher illumination levels throughout the room, also by finishing ceilings, walls, floors, and machines in light colors which reflect a high percentage of light. This reduces contrast between adjoining surfaces.

Directional and shadow effects are often desirable in general lighting. They accentuate the depth and form of solid objects. Clearly defined shadows are helpful in some operations, such as textile inspection. Harsh contrasts should be avoided.

Light levels. Recommended levels of light for various operations will be found in many reference books. The most comprehensive work is the *IES Lighting Handbook.* Much useful information will also be found in manuals published by manufacturers of lamps and fixtures.

Existing levels are determined from readings with a light meter at points where light is needed. This device gives a direct reading of the number of footcandles.

General lighting is the minimum amount of light required for an area. This has been defined as uniform distribution of light to produce approximately equivalent seeing conditions throughout an interior.

Localized general lighting sources are usually arranged 10 ft. or more above the work. They should prevent too great a contrast in brightness between the more highly lighted work area and the adjacent areas, provide

—*To page 22*

References—Lighting

(See also "Color," Section 2)

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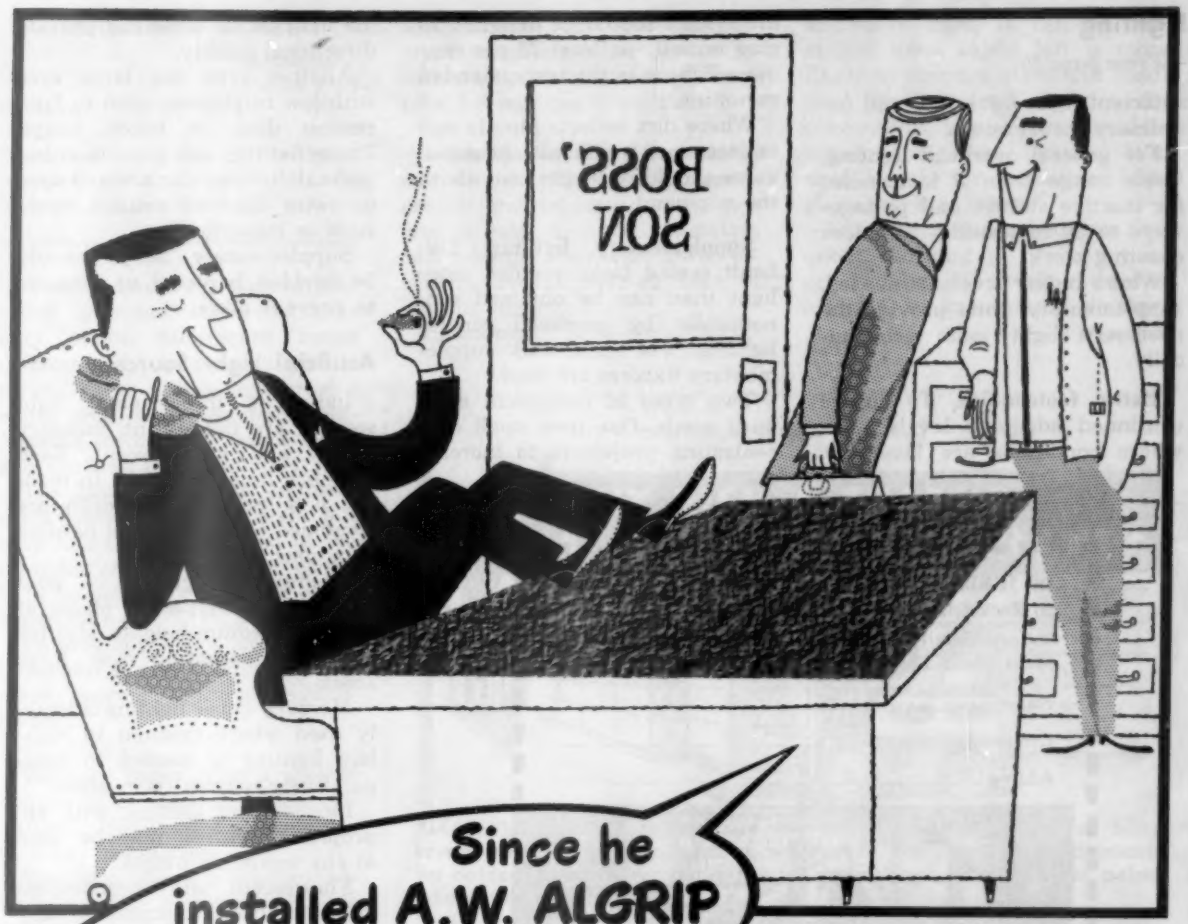

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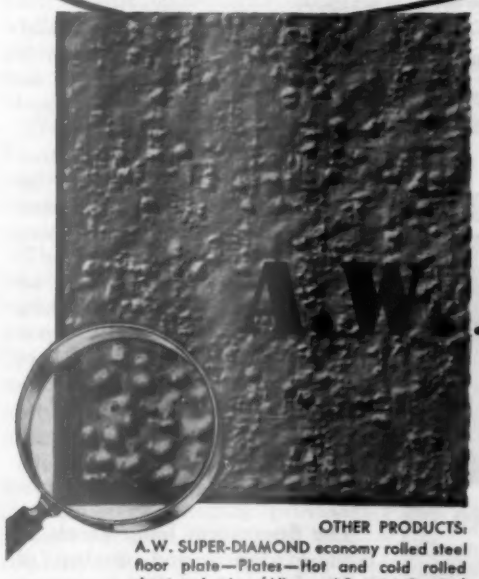
The absolute answer to a major "Boss' Son" problem. Prevents that spine shattering jar when your heels hit the floor, or loud "thuds" that wake up secretaries. In fact your heels can't slip!

But if you're a smart "Boss' Son", you'll think of other ways to use A.W. ALGRIP that increase plant safety . . . good will . . . production! You'll find that A.W. ALGRIP helps you reduce Accident Insurance costs at the same time.

A.W. ALGRIP Rolled Steel Floor Plate is made by a patented process in which a grinding wheel type abrasive is rolled—*not coated*—to a controlled depth, as an integral part of tough steel plate. Wear merely exposes more abrasive . . . safety lasts for the life of the installation.

Check your plant for areas where slipping hazards may exist. A.W. ALGRIP provides super-safe footing under the most hazardous slipping conditions—even on inclined surfaces. Send the coupon for A.W. ALGRIP information, today.



ALGRIP ABRASIVE ROLLED STEEL FLOOR PLATE

ALGRIP—*approved for safety by Underwriters' Laboratories*

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Company_____

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OTHER PRODUCTS:
A.W. SUPER-DIAMOND economy rolled steel floor plate—Plates—Hot and cold rolled sheet and strip—(Alloy and Special Grades)

Circle Item No. 2—Reader Service Card

Lighting

—*From page 20*

sufficient light for safety and for ordinary visual needs.

For general overhead lighting, levels range from 5 footcandles for inactive storage and passageways to 50 footcandles for more exacting work.

Where higher levels are needed, supplementary units provide the necessary light more economically.

Extra footcandles. To insure continued adequate levels, even where conditions are favorable, the system should be designed to give initially at least 25 per cent more light than the recommended minimum.

Where dirt collects rapidly and maintenance is difficult, the initial value should be 50 per cent above the minimum.

Supplementary lighting. Difficult seeing tasks require more light than can be obtained economically by overhead general lighting. For such work supplementary fixtures are used.

Two types of equipment meet most needs. One uses small concentrating projectors to increase the light on the work and provide directional quality.

Another type has large area with low brightness, such as fluorescent desk or bench lamps. These fixtures can provide either general lighting for a small area or extra light for critical work, such as inspection.

Supplementary lamps should be shielded, louvered, or mounted to prevent glare.

Artificial Light Sources

Industry's three major light sources are fluorescent, mercury vapor, and incandescent. Each type has its advantages. In modern practice, they frequently are combined to meet special lighting situations.

Fluorescent lighting is used widely in all types of plants at low and medium heights, also for high bay mounting over large areas.

Mercury vapor lighting is largely used where medium to high-bay lighting is needed in comparatively narrow room areas.

Incandescent lighting, with appropriate fixtures, may be used at any mounting height.

Fluorescent and incandescent lamps are used for supplementary bench and machine lighting.

Comparative efficiency. The efficiency of any light source is the ratio of light produced in lumens to power consumed in watts.

The fluorescent lamp, generally speaking, provides more than 3 times the light per watt of an incandescent lamp. It lasts approximately 7 times as long.

The mercury vapor lamp produces more than 2½ times the light per watt of an incandescent bulb and lasts more than 5 times as long.

An incandescent lamp can be used with any standard socket. Fluorescent and mercury vapor lamps need auxiliary ballast equipment. The wattage used by auxiliary equipment must be added to that consumed by the lamp to obtain the over-all wattage efficiency figure.

The fluorescent lamp excels in both efficiency and quality of light. In contrast to the more

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30 Rockefeller Plaza, New York 20, N. Y.

Gentlemen: Please send me complete information and prices about Flintkote FLINTDEK Anti-slip Coating.

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Learn how easily, quickly low cost FLINTDEK* prevents costly slippage

Send the coupon today for authentic facts and figures about *Flintdek*...Flintkote's anti-slip coating that is keeping floors safe in plants all over the world.

You'll see how easy and inexpensive it is to "Flintdek" *your* smooth steps, ramps, ladder treads, machine pedals and the like . . . reducing falling accidents, saving production time, improving plant appearance.

Flintkote *Flintdek* is a cohesive, resinous plastic. Provides a non-slip surface, wet, oily or dry. It is easily applied by trowel. And you can select from 5 Flintdek colors to harmonize with the colors now on your plant's walls and ceilings.

*Reg. U. S. Pat. Off.

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Circle Item No. 3—Reader Service Card

REFLECTANCE VALUES

	Reflectance Factor (%)
Ceilings	80
Walls	60
Desks and bench tops	35
Machines and equipment	25 to 30
Floor....not less than	15

brilliant "point" light sources provided by incandescent and mercury vapor, fluorescent lamps produce light in long, luminous tubes. These diffuse light over a wider area, make for more comfortable seeing and reduce glare and shadows to a minimum.

The fluorescent lamp produces three times the visible light but only half the radiant heat of the incandescent lamp. This cooler light helps reduce the cost of air conditioning.

Fluorescent lamps are offered in several shades of white light to meet specific lighting requirements.

Mercury vapor gives a greater volume of concentrated light per fixture. This makes it ideal for high-bay installation.

Excellent seeing is another advantage. The blue-white hue is well suited to the blacks, grays, and whites of many industrial operations. Long life is another feature—averaging more than a year on typical two-shift operation. Mercury vapor provides a compact, controllable light source which performs well in all temperatures. It is simple to maintain and has a wide variety of applications.

The basic color of the light can be modified by using color-improved mercury lamps or by combining with mercury or incandescent lighting.

The mercury-fluorescent combination is effective in medium-high bays which are easy to service and free from excessive dirt. It is recommended that mercury supply 60 to 80 per cent of the total light. Fluorescent will soften glaring contrasts.

In high bays twin units for mercury and incandescent can be installed. The mercury provides 50 to 65 per cent of the light. This combination is simple to maintain, offers little surface for dirt accumulation. It provides instant relighting after power interruption, when mercury lamps take 5-8 minutes to relight.

Incandescent offers low initial cost. No auxiliary equipment is needed and an incandescent system is easy to install, maintain and relamp. However, lower efficiency makes over-all cost of lighting higher.

Incandescent provides a "point" source of light. It can be controlled more easily but is more likely to produce glare and shadows. In industrial practice incandescent is becoming less popular for general lighting. It is used largely for specialized supplementary lighting.

Efficient operation requires frequent checking to prevent voltage variation. If circuit voltage is lower than rated lamp voltage,

—*To page 166*

Circle Item No. 4—Reader Service Card

WHY RISK A *TRAFFIC ACCIDENT* IN YOUR PLANT?

KLEAR-VU SAFETY MIRRORS are the answer to the dangerous blind corner problem in your plant or warehouse. They are also adaptable for outdoor use in your parking lot, loading dock area or other points where traffic converges.

Mounted at cross aisle intersections, entrances and exits at a height of 8 to 10 feet, Klear-Vu Safety Mirrors clearly reflect oncoming intersection traffic to both power truck operators and pedestrians.

Style	No.	Dimensions
Circular Convex Glass	120	12" dia.
Circular Convex Glass	180	18" dia.
Circular Convex Glass	240	24" dia.
Circular Convex Glass	300M.R.	30" dia.
Circular Convex Glass	360M.R.	36" dia.
Flat Glass Rectangular	918	9"x18"
Flat Glass Rectangular	1648	16"x24"

M.R. indicates metal rim.

Available in either convex or flat glass styles, the mirrors are easily installed and quickly adjustable to any desired angle.

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Write for Bulletin.

to make your plant SAFER...

Be sure to investigate Conductometer®, the easy-to-operate device for measuring the electrical resistance of flooring, personnel and equipment. A necessity where gases and explosives are used or stored. Helps prevent dangerous and costly explosions. U.L. Listed. Meets N.F.P.A. Requirements. Write for free details now.

As a further step toward greater plant safety inquire about the special conductive floorings and finishes manufactured by our business affiliate, Federal Flooring Corporation.

CONDUCTOMETER

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Circle Item No. 5—Reader Service Card

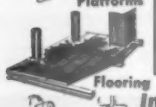
Circle Item No. 6—Reader Service Card

FOR MAXIMUM SAFETY all over your plant use Safety GRIP-STRUT

Pat. Pending

the new basic material, all in one piece (including channels), not welded, riveted or expanded in steel or aluminum, in standard sizes and gauges. Safety GRIP-STRUT presents an open space, in a diamond pattern, in excess of 55% of the area for ready access of light and air and gives a positive NON-SKID footing in all directions. Ideal for work platforms, stair and ladder steps, flooring, balconies, catwalks, machinery guards, fire escapes and for original equipment safety treads.

Work Platforms



Flooring

Machine Guards

Balconies

Important Safety Features

- ★ Fire proof
- ★ Slip proof
- ★ Maximum strength
- ★ Minimum weight
- ★ Easy to stand on
- ★ Cool in summer—warm in winter

Big Economy Features

- ★ For balconies—no extra light needed below—no extra heat.
- ★ No extra supports necessary—channels are integral part of the material
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- ★ Cut and installed like lumber by your own maintenance force
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Falls Mean Money Lost

but FERROX means safety first

Write for Ferrox Bulletin.

Serious slipping accidents can happen anywhere — in locker rooms, washrooms, on stairs, walkways, ramps, loading platforms, machine areas, etc. Low-cost Ferrox provides safe footing on all walking surfaces, wet, dry and oily. It can be trowelled over wood, concrete or metal . . . sticks tight . . . resists oil, chemicals and weather conditions. One gallon covers approximately 40 sq. feet. • Write for Ferrox Bulletin.

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AB189

Circle Item No. 7—Reader Service Card

Floors

—*From page 19*

Manufacturers' catalogs.

Floor experts, architects, or engineers.

Flooring Materials

Each material has its limitations. Some with good durability and resistance to slipping may be too expensive for general use. These are often usable for limited special areas where a sure footing or resistance to chemical or abrasive action is important.

Smooth, hard surfaces, such as concrete are susceptible to chipping and abrasion. Heavy falling objects and trucks with steel wheels chip away at the surface. Rubber tires are easier on floors as well as on ears.

Concrete is suitable for a wide variety of interior and exterior uses. It is excellent for damp locations, but does not withstand acids. The floor should be graded for drainage.

Drains with strainers are needed where the surface is cleaned by flushing or where there is possibility of flooding.

A durable roughened surface, resistant to cracking and dusting, can be obtained by a wood float finish to a mixture of pea gravel, sand, and cement. Too smooth a surface is slippery when wet and is actually more tiring to the feet than a rougher one.

Hardening compounds or sealers prevent dusting.

Pre-cast concrete floor slabs are often used for large areas, where the cost is said to be lower than for poured concrete. A granolithic or other finish may be laid over the slabs.

Concrete floors can be made conductive and non-sparking with surfacing compounds containing non-ferrous metallic aggregate. This treatment also makes the floor more wear resistant.

For repairing holes and cracks some compounds are superior to concrete. Patching with concrete, even when well done, may crack under heavy loads.

For painting, a general purpose floor enamel may be used but finishes prepared especially for

MANY TYPES of compounds are available for patching or resurfacing floors.

concrete are more durable. New concrete should be treated with zinc sulphate solution to neutralize alkalinity.

Concrete provides a rigid and substantial base for resilient types of flooring.

Resilient non-slip mats are an aid to comfort where employees must stand in one position for long periods. Those who move about in their work are less likely to complain about floors being cold or hard. Footwear also has a bearing on comfort.

Asphalt (hot mastic) is non-dusting, elastic, odorless, and easily repaired. Problems of application restrict its use indoors.

Asphalt is resistant to weather and moisture but is affected by oils, solvents, acids, and alkalis. It stands up well under traffic but ordinary grades soften at temperatures above 95 F.

Harder grades of asphalt remain firm up to 158 F. There are also acid-resisting grades.

Asphalt emulsion (cold mix), sold under various trade names, is made into a mortar with sand and cement, and laid about ½-in. thick. It is used extensively for patching. On a substantial wood base it will carry moderate traffic; with a concrete base it will take heavy trucking. The surface is somewhat harder than the hot mastic type. Both types are affected by oils, solvents, and heat.

Mastic flooring of other types usually has a resin binder. The materials are generally resistant to oils, solvents and alkalis, but the manufacturer should be consulted about the exposure. These materials are relatively high in

—To page 126

Stairs, Ramps, Fixed Ladders

WHERE operations are conducted on more than one level, permanent access structures are needed. These may be stairs, ramps or fixed ladders.

Choice of means of access is determined by local conditions including space available and nature of traffic.

Stairs are used where the grade is between 20 and 50 degrees from the horizontal.

Ramps should slope as little as possible; 15 degrees should be the maximum.

Fixed ladders are for grades over 50 degrees. They should not be installed if there is enough space for stairs or ramps.

Stairs

Long stair flights should be avoided. Landings every tenth or twelfth tread are recommended.

For grades between 7 and 20 degrees, a combination of stairs and level landings may be used.

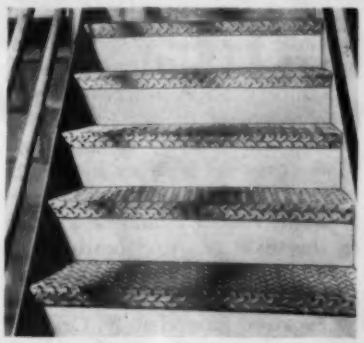
Adequate light should be provided for stairways. Burned-out lamps should be replaced promptly.

Treads and risers. Ratio between depth of stair treads and height of risers determines the angle or pitch of the stairs, which should be between 30 and 35 degrees from the horizontal.

Tread width and riser height must be constant for each flight.

Winders should be avoided if possible. Wedge-shape treads make it more difficult to ascend or descend safely.

Treads must be wide enough that, in descending the stairs, the



STAIR TREADS of extruded metal are durable and slip-resistant.

Circle Item No. 8—Reader Service Card

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SAFETY MIRROR
• Eliminate traffic accidents at blind corners inside and outside your plant —also at loading platforms.

Heavy Guage STEEL BRACKET:
(Furnished only on the 26" diameter mirror)
- Utility design
- Enables Optional installation on counters, posts, walls, ceilings, etc.
- Adjustable to height and position
- Easily installed in minutes

Traffic Safety Mirrors are available in Convex or Flat glass. All have a Yellow and Black Safety Stripe Border.
Round Convex Mirror Sizes
13" • 18" • 26" • 36"
Flat Rectangle Mirror Sizes
6"x14" 14"x18"
other special sizes to order
(Available in Unbreakable Metal Mirrors)

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- Simply slip GETS-A-LITE GUARD AND GUIDE over the fixture, as illustrated.
- Made of indestructible spring steel wire. Nothing to break, get out of order or replace. Will last indefinitely.
- Once installed, GETS-A-LITE GUARD AND GUIDE is NEVER removed.
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- GETS-A-LITE GUARD AND GUIDE actually steers lamp into socket, enabling maintenance man to change lamp in 10 seconds!
- Available for 40 watt and 100 watt fluorescent lamps.

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Circle Item No. 9—Reader Service Card

ball of the foot does not project beyond the nosing and the heel does not strike against the riser above.

Building Exits Code, A9.1, specifies that treads of new stairs shall be not less than 9½ in. exclusive of nosing; also that no tread of less than 6 in., exclusive of nosing, shall be permitted.

Stairs subjected to severe use should have treads with a durable non-slip surface. Materials used for original installation or repairs include:

Concrete
Abrasive metal
Steel with extruded patterns
Grating
Plastic compounds
Rubber and fabric with abrasive surface.

Risers should not be more than 8 in. nor less than 5 in. in height. Greater or less height will cause an unnatural stride which may result in a serious fall.

Railings and handrails. ASA Code *Floor and Wall Openings, Railings and Toe Boards, A-12,* requires that every flight of stairs having 4 or more risers shall be equipped with standard stair railings or standard handrail as specified.

Spiral stairways are installed where there is not enough space for conventional stairways. Both types of stairs can be installed by plant personnel from standardized metal parts obtainable with a variety of slip-resistant treads.

Ramps

Ramps facilitate wheeled traffic between levels. For foot traffic they are preferable to stairways when it is practicable to use them. They should be built to the least slope possible. Maximum recommended slope is 15 degrees. A rise of more than 1 ft. in 10 is prohibited in some states.

For wood ramps materials used in construction should meet the requirements for scaffolds. Width should be adequate for traffic and open sides should be protected with standard railings 42 in. high.

Toe boards should be installed where the ramp extends over a work place or passageway. Cleats 16 in. apart are needed on steep inclines.

Planks should not overlap. The length of the plank should run the long way of the ramp. Ramps used for wheelbarrows should have an odd number of planks with no cleats on the center plank. Width should be not less than 3 ft.

Concrete ramps are recommended for heavy traffic. Anti-slip surface is obtained by rough floating or incorporated in the finish coat. Hardeners and troweling should be avoided.

Concrete that has been worn smooth can be roughened by scrubbing with dilute nitric or muriatic acid. The surface is then hosed to remove all traces of acid.

Ramps used by heavy vehicles, such as power trucks and heavy-duty hand trucks, should have solid curbs as well as handrails.

Ramps included as part of aisles or traffic routes should be as wide as the aisle to avoid bottlenecks.

Splinters, nails, irregularities and breaks in the surface should be repaired immediately. Cracked or pitted concrete can be resurfaced with one of the numerous flooring compounds on the market.

Outdoor ramps and platforms should be kept clear of snow and ice in winter. If ice cannot be removed immediately, sand or cinders may be applied to give traction. In cold climates radiant heating installed in the concrete is often a good investment.

Fixed Ladders

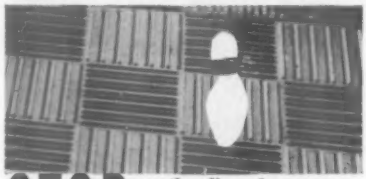
Fixed ladders should have parallel sides of wood or metal, and should be permanently fastened at top, bottom and intermediate locations. If 20 ft. or longer, the ladder should be provided with cage or basket guard.

Fixed ladders over 30 ft. long should be built in zigzag sections, unless cages are used, and should be provided with platforms at intervals of not more than 20 ft.

Side rails should be carried 3½ ft. higher and preferably goose-necked. Openings more than 18 in. between the ladder and the working platform should be protected by a landing platform. ***

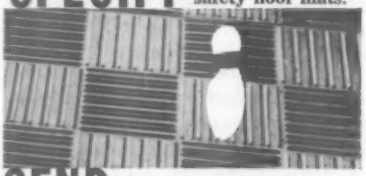
Circle Item No. 11—Reader Service Card

TAKE THESE 3 SIMPLE STEPS TO SAFETY



STOP costly slips, dangerous operator fatigue.

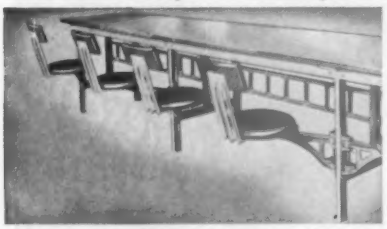
SPECIFY Brabrook for best safety floor mats.



SEND for BRABROOK specialist advice and literature on your safety underfoot problems.

A. N. BRABROOK Inc.
552 WEST 53rd ST., NEW YORK, N. Y.

Seat More People in Less Space!



"Lifetime" Cast Construction
SECTIONAL TABLES
For Industrial Dining Rooms, Schools, Hospitals, Institutions

Seats swing out of the way, save space... save maintenance ... eliminate confusion of loose chairs. Rugged cast construction for lifetime service. New colorful tops in Formica, Stainless Steel, Cafolite, or Edge Grain Maple—cast iron bases in choice of colors. Seat 4 to 24 people.

- TABLES
- STOOLS
- SWING SEATS

Write Today for Catalog Showing Installations

Distributors in Principal Cities
THE CHICAGO HARDWARE FOUNDRY CO.
1038 Commonwealth Ave., NORTH CHICAGO, ILL.

Circle Item No. 10—Reader Service Card

IN SECTION 2:

Housekeeping and Sanitation 29
Color 30
Portable Ladders 36
Safe Scaffolds 44

AN INDUSTRIAL PLANT has a large investment in buildings, equipment and personnel. Housekeeping—a useful term which covers a wide range of maintenance and sanitation items—helps to conserve the company's investment. It controls many of the causes of accidents, fires, wasted time, spoiled materials, and occupational diseases.

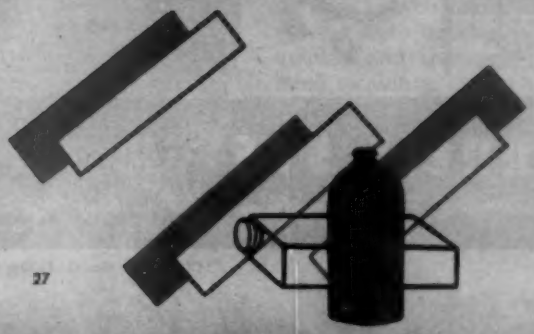
Good housekeeping means clearly marked and uncluttered aisles, floors free from litter and oil slick, orderly storage, freshly painted surfaces, and well-maintained equipment.

This requires organization, training, and supervision. It also requires equipment and supplies.

Building maintenance involves much work at higher levels. This requires ladders and scaffolds, selected for the job and kept in serviceable condition.

2

HOUSEKEEPING and MAINTENANCE

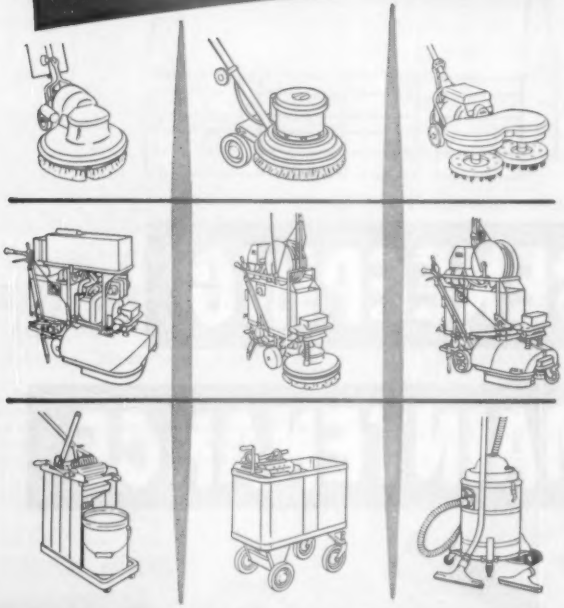


Keep your floor-maintenance men happy . . .

with Job-Fitted EQUIPMENT!

Choose from the COMPLETE Finnell Line

More than a score of models and sizes permits selection of the equipment that's exactly right for your job!



However much a maintenance man may want to do a good job, and at the same time show savings in labor costs, he's *stymied* if the machine is too small, or too large, or is otherwise unsuited to the job. Different floors and areas call for different care and equipment. That's why *Finnell makes more than a score of floor-maintenance machines.* From this complete line, it is possible to choose equipment that is correct in size as well as model . . . that provides the maximum brush coverage consistent with the area and arrangement of the floors.

Finnell offers *Conventional Polishing-Scrubbing Machines* in both concentrated and divided-weight types, each in a full range of sizes . . . a *Dry-Scrubber,* with self-sharpening brushes, for cleaning grease-caked floors . . . *Combination Scrubber-Vac Machines* for small, vast, and intermediate operations, including self-powered as well as electric models . . . *Mop Trucks* . . . a *Wet and Dry Vacuum Cleaner,* in baked enamel or stainless steel, with 1½ hp By-Pass Motor. In addition, *Finnell* offers a full line of fast-acting *Cleansers* for machine-scrubbing . . . *Sealers* and *Waxes* of every requisite type . . . *Steel-Wool Pads* and other accessories — *everything for floor care!*

In keeping with the *Finnell* policy of rendering an individualized service, *Finnell maintains a nation-wide staff of floor specialists and engineers. There's a Finnell man near you* to help solve your particular floor-maintenance problems . . . to train your operators in the proper use of *Finnell Job-Fitted Equipment and Supplies* . . . and to make periodic check-ups. For consultation, demonstration, or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 2203 East Street, Elkhart, Indiana. Branch Offices in all principal cities of the United States and Canada.

FINNELL SYSTEM, INC.

Originators of Power Scrubbing and Polishing Machines

Everything FINNELL For Floor Care

BRANCHES IN ALL PRINCIPAL CITIES

Circle Item No. 12—Reader Service Card

Housekeeping and Sanitation

The foundation for effective safety work

HOUSEKEEPING and its twin, sanitation, involve every phase of industrial operation. Their activities cover the entire premises —indoors and out. The benefits extend throughout the community.

Housekeeping is the combined responsibility of management, supervision and employees. Maintaining interest requires constant effort through supervision and visual aids.

To maintain the industrial environment for maximum support to production and to employee health, safety and comfort, the following tasks are involved:

1. Structural cleaning.
2. Floor maintenance and cleaning.
3. Maintenance of personal service facilities, such as washrooms, lockers, offices, lounges, in-plant food service.
4. Machine and equipment cleaning, both in place and in special stations and facilities.
5. Control of insect and rodent pests.
6. Collection, salvage and disposal of refuse and product wastes.
7. Operation of uniform and laundry services and of sanitation stockroom and supply inventory.
8. Protection of raw materials and finished products against damage and deterioration.
9. Supervision of plant security personnel.
10. Care of exterior areas, including parking, roadways, walkways, and landscaping.
11. Maintenance of safe working conditions.
12. Maintenance of industrial hygiene facilities.
13. Overall sanitary surveillance.

From *Building and Equipment Sanitation Maintenance*, by J. Lloyd Barron and Albert J. Burner. Published by Association of American Soap and Glycerine Producers, 242 Madison Ave., New York.

The Plant

A well-designed, well-built plant can be kept clean, orderly, and free from hazard with much less time, effort, and expense. Here are factors to consider:

—**Aisles:** Wide enough for movement of traffic, marked off by floor lines from work stations and storage areas.

—**Space:** Sufficient room for the individual to work.

—**Storage:** Adequate and convenient for materials and tools.

—**Materials handling:** Layout planned for material flow, with efficient methods and equipment.

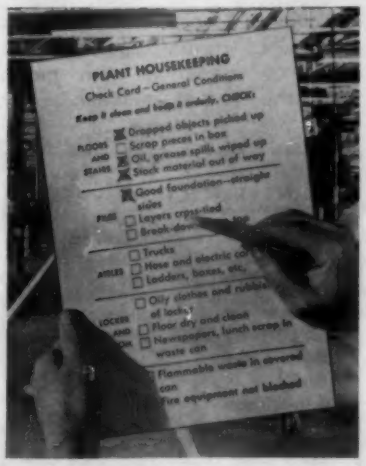
—**Ventilation:** Good general ventilation, plus local exhaust ventilation to remove air contaminants at source.

—**Floors and walls:** Of construction and materials easy to keep clean and in repair.

—**Lighting:** Well-distributed artificial light and effective use of available daylight.

—**Personal service facilities:** Clean, up-to-date washrooms and lockers; an inviting place where employees may eat lunch.

—**Waste removal:** Adequate facilities needed to prevent congestion and disorder.



CHECK LISTS keep the inspector from overlooking important points.

Organization

An adequate crew of able-bodied, intelligent employees is essential. They should be well-trained in their duties and provided with necessary cleaning equipment and supplies.

For larger plants, a manual for the maintenance force is helpful in standardizing procedures.

Women are usually employed for lighter duties, such as office cleaning and routine care of women's rest rooms.

Cleaning Equipment

Vacuum cleaners. Heavy duty types are available in several models and capacities, with a variety of attachments. They are useful for removing dust from corners and from places overhead as well as for floor cleaning.

Where dust sources are close together and a large volume of dust must be removed, a piped system may be practical. Cleaning implements are attached to inlets located at close intervals. Some hotels and office buildings use this type of dust removal.

For most industrial uses, portable vacuum cleaners are satisfactory. In most operations, the dust sources are widely scattered and portable equipment meets all requirements.

Floor machines of several types handle heavy jobs of floor cleaning efficiently. With them, floors can be scrubbed or dry-cleaned, waxed and polished. Like vacuum cleaners, floor machines can be obtained with a variety of attachments.

Crusts of dirt, oil, and metal cuttings can be removed with revolving wire brushes much more quickly and thoroughly than by hand spudding.

For finer finishing, steel wool rolls can be used. A vacuum pick-up for collecting dust is essential for dry operations. Suction in connection with a scrubber damp-

—*To page 73*

Put Color to Work

Expertly used, it can:

- **Conserve light—improve visibility**
- **Create cheerful surroundings—restful or stimulating**
- **Make a room seem cooler or warmer, larger or smaller**
- **Encourage better housekeeping**
- **Identify fire and accident prevention equipment**
- **Spotlight point-of-operation on machines**
- **Add punch to instruction and warning signs**

COLOR has many functional as well as decorative uses and its applications in industry are steadily growing. But it must be applied according to established scientific principles. Otherwise the result will be a riot of distracting hues. Paint manufacturers and color experts have conducted considerable research on the subject and help is readily available.

Psychological effects. Certain colors have been found to produce definite mental and emotional responses. Familiar colors and the reactions they arouse are:

Yellow—cheering and stimulating.

Blue—gives a feeling of coolness; helpful where temperatures are uncomfortably high.

Green—restful to the eyes. Blue-green is cool; yellow-green is warmer.

Red—danger, excitement; traditionally associated with fire.

Orange—bright and warm; use with caution.

Violet, purple—rich warm colors associated with luxury.

Background Colors

The old plan of white for ceilings and upper walls with "practical" dark colors for dadoes and machines is being replaced by color schemes which provide more cheerful and attractive interiors. Paint companies and color consultants will be glad to furnish advice.

Sharp contrasts between bright and dark areas should be avoided. They require continual adjustment of the eyes in looking from one to the other, causing eyestrain and fatigue.

White is favored for ceilings; it reflects more light—80-88 per cent. But for rooms with low ceilings, or where people may look up at them, as in hospital rooms, cream, ivory or sky blue is preferable to solid white.

For overhead networks of girders, pipes and other equipment, colors of high reflectance also are desirable.

For sections of walls within the range of vision, soft tints, such as light gray, green or blue, are suitable. Soft gray, for example, is restful and does not show dust readily.

A dado the height of work benches and machines—about one third the height of the wall—makes soil and marks less conspicuous. It may be a deeper tone of the color of the upper wall but should not be too dark.

Floors should have a reflectance value of at least 25 per cent. For machines, benches and desks, 25 to 40 per cent is suggested.

Point of Operation

To make it easier to see work and avoid injury, spotlight the point of operation with paint. Paint the body of the machine one color and working areas another.

Four standard shades of "machine gray" are available. Critical parts can stand out in cream, light tan, or other light contrasting color.

Light sources and color. Type of light should be considered in planning the color scheme. Incandescent lamps reduce strength and intensity of color because the light has a slight yellowing effect.

Fluorescent lamps are offered in several types. The four most common are: standard warm white, standard cool white, de luxe warm type, and de luxe cool type. Cool white units give a bluish hue and can be used with blue, green, and blue-violet. Warm white is suitable for ivory, cream, beige, rose, and tan. The de luxe lamps are used in plants where color discrimination is exacting, as for inspection, and in lounges, cafeterias, and display rooms.

PAINT REFLECTION VALUES

(Per cent)

White	88
Ivory	69
Cream	67
Sky blue	65
Pale green	59
Buff	52
Aluminum	41

These values are only approximate since colors vary with different paint manufacturers.

Color for Identification

Safety codes for the use of standard colors for identification of equipment and hazards have been developed by the American Standards Association. *Safety Color Code for Marking Physical Hazards and the Identification of Certain Equipment Z53.1—1953* specifies uniform colors for marking physical hazards, for indicating the location of safety equipment and for identifying fire and other protective equipment.

Some chemical and petroleum companies have introduced minor variations from the ASA code, particularly where specific problems have been created by special products.

Red is for identification of fire-protection apparatus, and for walls or supports on which extinguishers are mounted; flammable liquid containers (except shipping containers) on which the name of the contents should be stenciled; lights at barricades and danger signs; emergency stops on machines such as rubber mills, wire blocks and flat work ironers, and emergency stop buttons for electrical switches.

Yellow has high visibility, suitable for marking hazards that may

THE FIRST AND ONLY UL LISTED EXPLOSION PROOF FLOOR MACHINE!

HILD

UL Listed for use in Class 1, Group D and Class 2, Group G hazardous locations.

For many years industry has respected Underwriters' Laboratories as the leading authority on safety equipment. Hild now offers you the only UL Listed explosion proof floor machine—designed and manufactured to UL specifications. Unless the explosion proof floor machine you are now using is designed to the same high specifications as this Hild model, it is unlikely that you have full protection. The fact that you read this advertisement means you are interested in safety—if so, you will want this new Hild equipment in your plant.

BE INFORMED, MAIL COUPON NOW!

Hild manufactures a complete line of UL Listed explosion proof vacuum cleaners—four models from 6 to 55 gallon capacity—wet and dry pickup.

HILD

FLOOR MACHINE COMPANY, INC.
1217 West Washington Blvd.
Chicago 7, Ill.

HILD FLOOR MACHINE COMPANY, INC. NS-38
1217 West Washington Blvd., Chicago 7, Ill.

Without cost or obligation, send me complete information on HILD explosion proof cleaning equipment.

Name, Title_____

Company_____

Address_____

City_____ Zone____ State_____

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result in slipping, falling, and bumping into objects. Solid yellow and stripes or checks of yellow and black, may be used to attract special attention. Top and bottom treads of stairways, low beams and pipes, and crane hooks are places where yellow may be used.

Black and yellow stripes often are used on mobile equipment, such as tractors and industrial locomotives.

Green in combinations with white, such as a green cross on a white background, designates location of first-aid and safety equipment. Location of stretchers, gas masks, and bulletin boards is identified by this color.

Black and white, in stripes or checks, are used for housekeeping and traffic markings.

Orange has high attention value. It is the basic color for marking dangerous parts of machines or energized equipment. It emphasizes such hazards when enclosure doors are open, or when gear, belt or other guards around moving equipment are open or removed, exposing unguarded hazards.

Blue is for warnings, such as painted barriers or flags. These should be located conspicuously at the starting point or power source of machinery.

Purple is the basic color for designating radiation hazards. Yellow should be used with purple for tags, labels, signs, and floor markers.

Indentification of Piping

Five basic colors for identification of the contents of pipes are specified in ASA Code, *Scheme for Identification of Piping Systems, A13.1-1956.* Identification may be provided by stenciled legends, decalcomanias, self-adhesive tape, or painted stripes.

Basic identifying colors are:

F. Fire protection—red.
D. Dangerous materials—yellow or orange.
S. Safe materials—green or achromatic colors (white, black, gray, aluminum).
P. Protective materials—bright blue.

Color may be applied the entire length of the pipe or in bands 8-10 in. wide near valves and pumps, and at intervals along the line. The name of the specific material is stenciled in black con-

—*To page 131*

References—Color

National Safety Council: Color in Industry; Data Sheet D-218.
—Try Color; Reprint Gen. 10.
National Safety News: Progress With Color; Howard Ketcham, Nov. 1952. Out of the Gray; N. A. Mason, Oct. 1953.
—Purposeful Color; Faber Birren, Part I, June 1955; Part II, July 1955.
—Color in Safety, Italian Style; Faber Birren, Sept. 1955.
—How Color Can Serve You; D. E. Garrett and W. A. Jordan, Sept. 1956.
—What's in That Pipe? E. G. Heuser, Oct. 1956.
American Standards Assn.: Marking Physical Hazards and Identification of Certain Equipment, Safety Color Code for Z53.1-1953.
—Identification of Piping Systems, Scheme for, A13-1956.

Circle Item No. 14—Reader Service Card

Take the hazard out of Floor Maintenance

WITH HOLT EXPLOSION PROOF COMMANDER

Holt Commander is designed expressly for safe maintenance of floors in oil refineries, atomic research plants, powder factories, and other hazardous industries. There's no outside wiring, Entire unit, from brush to handgrip, is constructed, sealed and safety-tested to prevent sparks and static that might ignite gas, dust, fumes or vapors. Static eliminator wire in brush, a Holt exclusive, even prevents shocks to operator.

With this one machine and Holt Quick-Change Attachments you do a complete floor maintenance job — polish, wax, buff, scrub, etc. Dual handles give operator better control; reduce fatigue. Made in 16 and 20" sizes. For full story write now to Dept. W3

Sales and Service Centers in Major Cities

32

HOLT MANUFACTURING CO.
BETTER FLOOR MACHINES FOR MORE THAN 30 YEARS

669 - 20th St., Oakland 12, Calif., or 272 Badger Ave., Newark 8, N. J.

BABCOCK Industrial
***Safety Engineered* LADDERS**

FIRST Choice of Industrials and Contractors. The NEW Safety Step (right) is only one of Babcock's complete line of Industry-tested ladders. Built for a long life of service—BABCOCK quality in every inch.

Write for the Babcock Industrial Ladder Folder, describing other Extension Ladders, Single Ladders and Step Ladders.

BE SURE • BE SAFE • BUY BABCOCK

the W. W. BABCOCK CO., INC.
BATH, NEW YORK

Circle Item No. 15—Reader Service Card

Circle Item No. 16—Reader Service Card →

Pittsburgh COLOR DYNAMICS® improves working conditions in plant that makes 1½ million screws daily

Properly engineered color plan in the E. W. Ferry Screw Products factory increases productive skill and reduces danger of time-loss accidents

NEXT TIME you select color for work areas in your plant, discard old-fashioned haphazard methods and do it the up-to-date way—with Pittsburgh COLOR DYNAMICS.

By selecting colors according to this modern system of painting you can improve productive efficiency of your workers, enhance morale and reduce danger of accidents.

An example of such results is found in the Cleveland, Ohio plant of E. W. Ferry Screw Products, Inc. This company produces more than a million and a half fasteners of many types daily for the automotive, airplane and household appliance industries. Besides making conventional screws, it pioneered the development and use of stainless steel screws in volume.

Several years ago the Ferry plant was painted according to COLOR DYNAMICS. The benefits from this are summarized by Robert E. Ferry, vice-president of manufacturing:

"It had been our custom to paint plant and equipment largely for the purpose of protecting them against wear and deterioration. Then we decided to color-engineer our facilities the COLOR DYNAMICS way.

"Focal colors on working parts of machines, in contrast to eye-rest color on stationary parts, help our workers see their jobs better. We have further reduced eye strain by using restful colors on walls and colors with high reflectance on ceilings. This has reduced physical fatigue and improved concentration. Safety colors which denote hazard areas have lessened danger of accidents. All this has contributed to better workmanship. Relations between management and workers has been improved. It is highly satisfying that we have been able to get all these advantages at no greater cost than normal maintenance painting."

You can test the practical value of COLOR DYNAMICS in your plant. Try it on a machine or two, or in a complete department—and see the difference it makes.

HOW YOU CAN GET A FREE COLOR PLAN OF YOUR PLANT

● We'll be glad to mail you a free copy of our fully-illustrated book which explains the principles of COLOR DYNAMICS and how to use them in industry. It contains numerous practical suggestions. Better still, we'll be glad to prepare a color plan suited to your type of plant, containing detailed specifications, without cost or obligation. Call your nearest Pittsburgh Plate Glass Company branch and arrange to have a representative see you. Mail coupon at right.

Send for a Copy of this FREE Book

Pittsburgh Plate Glass Co., Paint Div.
Department N-SN-38, Pittsburgh 22, Pa.

☐ Please send me a FREE copy of your booklet "Color Dynamics."

☐ Please have your representative call for a Color Dynamics Survey without obligation on our part.

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Street_____

City_____

County_____ State_____

PITTSBURGH® PAINTS

SYMBOL OF SERVICE FOR SEVENTY-FIVE YEARS

75th ANNIVERSARY 1883–1958

PITTSBURGH PLATE GLASS COMPANY

IN CANADA: CANADIAN PITTSBURGH INDUSTRIES LIMITED

G. ALLAN MacNAMARA

Portrait by Fabian Bachrach

"IT'S AGAIN FASHIONABLE TO BE THRIFTY— and 69% of our Soo Line employees are saving regularly through the Payroll Savings Plan"

"It's again fashionable to be thrifty, and it is reassuring to note that 69% of our employees on the Soo Line are making regular purchases of U. S. Savings Bonds. Inflation is a complex thing, but here is a simple, direct step every one of us can take to help control the rising price spiral. Our recent company-wide campaign has proved that employees *want to* and *will* practice thrift by buying U. S. Savings Bonds."

G. ALLAN MacNAMARA, *President, Soo Line Railroad*

Individual savings are the bedrock of a sound economy. Today there are more Payroll savers than ever before in peacetime. If employee participation in *your* Payroll Savings Plan is less than 50% . . . or if *your* employees do not now have the opportunity to build for their future through the systematic purchase of U. S. Savings Bonds, your State Director will welcome an opportunity to help. His experience is yours, in setting up a Payroll Savings Plan or in building up enrollment in one already existing. Look up your State Director in the phone book. Or write: Savings Bonds Division, U. S. Treasury Dept., Washington, D. C.

NATIONAL SAFETY COUNCIL

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE

WHERE STATIC LURKS

Legge Maintenance Works-

The files of the NFPA show an alarming number of cases of fire and grim wreckage caused by unharnessed static electricity. One little spark in the presence of vapors, combustible gases, chemicals or film can wreak havoc!

Fortunately, more and more buildings are fighting this menace by installing conductive floors in hazardous areas. But is that enough?

Machinery, equipment and personnel—all generators of static charges—are grounded to the conductive floor, forming a single electrical potential. It is *vital* that these generators be prevented from losing contact with the conductive surface. Faulty maintenance or inadequate accessories often reduce the value of conductive flooring to zero.

NoStat anti-static device for personnel.

Elimstat, for machinery and equipment.

Legstat, low cost anti-static device.

Conductive Bootie.

Specialists in conductivity since 1934

Ordinary cleaners and waxes tend to insulate the surface of the floor from the generators, causing loss of contact. That's why HUBBELLITE, CONGOLEUM-NAIRN and other leading makers of conductive flooring recommend the *exclusive* use of LEGGE polishes, seals and cleaners. They *retain* conductivity. They guarantee that your building will conform to the requirements of NFPA Code #56 and all other State, municipal and military codes.

For a quarter century, LEGGE has pioneered in the development of these materials as well as anti-static devices for personnel, equipment and machinery. Our staff of specialists is trained in every phase of conductivity. Their services are Free.

If you now have conductive floors or ever plan to install them, don't fail to clip the coupon for our descriptive booklet, "One Little Spark".

WALTER G. LEGGE COMPANY, INC.

Dept. N-3, 101 Park Ave., N. Y. 17, N. Y.

Branch offices in principal cities.

In Toronto—J. W. Turner Co.

WALTER G. LEGGE CO., INC. Dept. N-3
101 PARK AVE., NEW YORK 17, N. Y.

Urgent. ☐ Send me a copy of your booklet, "One Little Spark".

Name.....

Firm.....

Street.....

City..... Zone..... State.....

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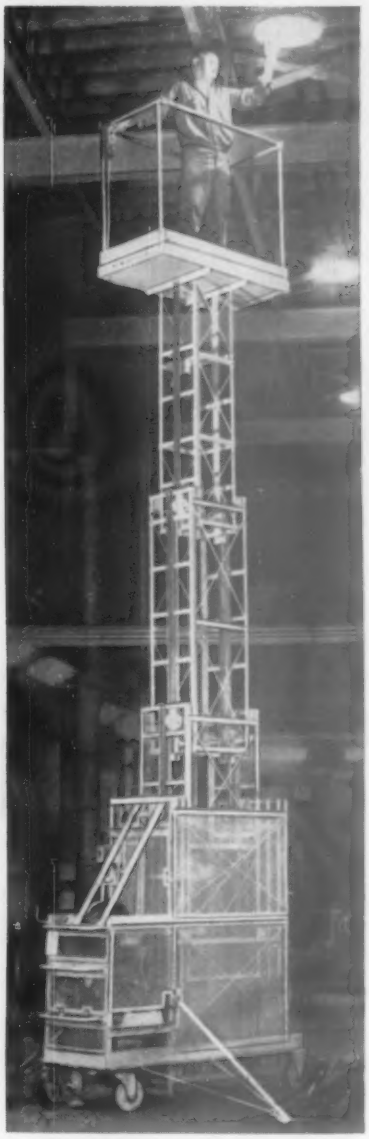


The man who feels safe works better on overhead maintenance

Safety is our first consideration in building Hi-Reach Telescopers.

Model LB (illustrated), push-button control on platform. Four heights 20 ft. to 35 ft. (all models lower to clear doorway 6'-8" by 36"). Priced from $1510.00 up. Model PUL Hand Operated Lift — 15 ft. — $400.00. Custom-built lifters up to 100 ft.

Write for catalogue

Economy Engineering Co., 4518 W. Lake St., Chicago 24, Ill., 342 Madison Ave., New York 17, N. Y.

ECONOMY ENGINEERING

Circle Item No. 18—Reader Service Card

Portable Ladders

EVERY DAY countless persons climb ladders to reach some elevated point and rarely do these ladders fail them. There would be even fewer failures if ladders were selected for the needs of the job and given proper care.

Where frequent access to any location is needed, stairways or fixed ladders should be installed. But for occasional jobs at scattered points, the portable ladder is indispensable.

Accidents with even sound ladders may result from unsafe work practices, and sometimes the physical disability of the user may be responsible.

Standards

A reliable guide is the American Standard *Safety Code for Portable Wood Ladders, A14.1-1952.* Ladders built according to its specifications are plainly labeled.

Another safeguard for purchasers of wood ladders is the label of Underwriters' Laboratories carried by ladders and ladder shoes which pass the laboratories' tests.

Metal ladders are now covered by ASA *A14.2-1956.* Standards for aluminum and magnesium ladders had previously been established by the Metal Ladder Manufacturers' Association, organized in 1949.

Definitions

Nine types of ladders commonly used in industry are defined in the American Standard Safety Code:

1. **Stepladder.** A self-supporting portable ladder, non-adjustable in length, having flat steps and a hinged back. Size is designated by overall length of ladder measured along front edge of side rails.

2. **Single ladder.** A non-self-supporting portable ladder, non-adjustable in length, consisting of but one section. Size is designated by overall length of side rail.

3. **Extension ladder.** A non-self-supporting portable ladder adjust-

could he do this SAFELY... on your stairs?

HE COULD . . . if your stairs and floors had the protection of *Cosmolite®* *Anti-Slip Wax.* This special wax reduces slip hazards and maintains the beauty of any type flooring. So to put safety in the shine, use *Cosmolite Anti-Slip Wax.* Write today for complete information and prices.

Let the Man Behind the Drum . . . your Huntington representative help you! Write for his name today.

HUNTINGTON

HUNTINGTON LABORATORIES INCORPORATED

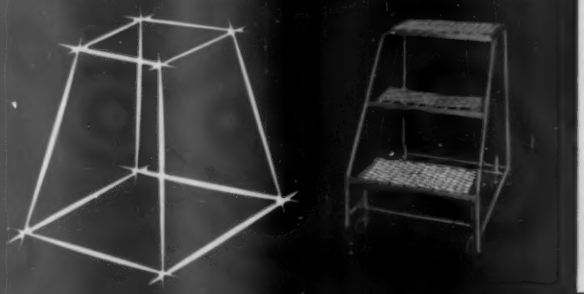
Huntington, Indiana

Philadelphia 35, Pennsylvania • Toronto 2, Ontario

Circle Item No. 19—Reader Service Card

NEW CONCEPT OF SAFETY AND STABILITY ACHIEVED IN BALLYMORE Safety-Step LADDERS

REVOLUTIONARY PYRAMID DESIGN GIVES ADDED SAFETY



PYRAMIDED FOR SAFETY

SECURE FEELING OF WORKERS RESULTS IN BETTER, FASTER WORK

The new pyramid design of BALLYMORE Safety-Step LADDERS offers above-floor working safety never before available. Safe, sturdy, well balanced, these new ladders will not sway, tilt or "kick out." Because workers feel safer, their jobs are performed quicker and with more accuracy.

Fingertip mobility, supplied by large casters, permits quick, easy relocation of ladders...saves time and money.

Thirty-five models offer work levels up to fifteen feet. All-welded construction assures permanent stability.

Write to the Ballymore Company, West Chester 17, Pa., for the new 20-page catalog describing the complete line of Ballymore equipment for above-floor working safety.

MANY MODELS TO CHOOSE FROM

STEEL OR ALUMINUM

Three-step, "A" type

Casters provide fingertip mobility. Rubber-tipped legs lock to floor when in use.

Three-step, Handrails

Two-step, All-Aluminum

Seven-step, Handrails

Five-step, All-Aluminum, Handrails

CHOICE OF HEIGHTS:
One to seven steps, steel.
One to five steps, aluminum.

CHOICE OF WIDTHS:
20" or 30" at bottom.

BALLYMORE "Hi-boy" SAFETY-STEP LADDERS with BALLYLOCK

Step on the pedal, two legs and non-swiveling rear casters hold ladder firmly in place while in use. Release pedal, ladder rolls easily to location of next job.

Eight-step, work levels to twelve feet.

Maintenance jobs accomplished quickly, easily at heights up to 15 feet with 12-step "Hi-boy."

Maintenance and repairs of operating and ventilating equipment require the stability and mobility of Ballymore all-steel welded "Hi-boy" Ladders.

TOP PRODUCTION WITH SAFE, CONVENIENT WORK PLATFORMS AND HYDRAULIC LIFTS

A complete line of fixed and adjustable-level work platforms and mobile access lifts is offered in many standard production sizes. Work levels of platforms available up to 15 feet; access lifts up to 42 feet. Special platforms and lifts designed and manufactured to fulfill specific requirements.

THE STANDARD BY WHICH ABOVE-FLOOR SAFETY IS JUDGED

BALLYMORE

EQUIPMENT FOR ABOVE-FLOOR WORKING SAFETY

Circle Item No. 20—Reader Service Card

able in length. It consists of two or more sections traveling in guides or brackets so arranged as to permit length adjustment. Size is designated by sum of lengths of sections measured along side rails.

4. Sectional ladder. A non-self-supporting portable ladder, non-adjustable in length, consisting of two or more sections so constructed that the sections may be combined to function as a single ladder. Size is designated by over-all length of assembled sections.

5. Trestle ladder. A self-supporting portable ladder, non-adjustable in length, consisting of two sections hinged at the top to form equal angles with the base. Size is designated by length of side rails measured along front edge.

6. Extension trestle ladder. A self-supporting portable ladder, adjustable in length, consisting of a trestle ladder base and a vertically adjustable single ladder, with suitable means for locking the ladders together. Size is designated by length of trestle ladder base.

7. Special-purpose ladder. A portable ladder which represents either a modification or a combination of design or construction features in one of the general purpose types of ladders previously defined, in order to adapt the ladder to special or specific uses.

8. Trolley ladder. A semi-fixed ladder non-adjustable in length, supported by attachments to an overhead track, the plane of the ladder being at right angles to the plane of motion.

9. Side-rolling ladder. A semi-fixed ladder, non-adjustable in length, supported by attachments to a guide rail, which is generally fastened by shelving, the plane of the ladder being also in its plane of motion.

Materials and Construction

Wood, which meets the requirements of weight and strength at moderate cost, is the most widely used material. Acceptable kinds and grades of wood are listed in the ASA Code.

Ladders may have either spreading or parallel straight lines. They may have sides flaring at the base to increase stability, and converging at the top for specific uses.

Laminated ladders. Side rails of laminated wood have high strength-weight ratio, are able to carry substantial loads after initial failure, give distinctive sound

Circle Item No. 21—Reader Service Card

SAFETY FACTS for Industry

MOST SAFETY DIRECTORS INSIST ON Safe-Hi LADDER SHOES!

BECAUSE Safe-Hi LADDER SHOES ARE U/L APPROVED FOR ALL SURFACES! THIS EQUIPMENT ENABLES WORKERS TO PERFORM LADDER JOBS WITH SAFETY* AND EFFICIENCY—NO NEED OF "HELPER" TO HOLD BASE OF LADDER!

* A 1949 REPORT OF THE N.Y. WORKMEN'S COMPENSATION BD. SUMMARIZING 21,000 FALL ACCIDENTS, DISCLOSED SLIPPING LADDERS AS THE PRINCIPAL CAUSE OF LADDER ACCIDENTS.

DIAGRAM SHOWING ACTUAL HOLDING POWER OF Safe-Hi LADDER SHOES UNDER CONDITIONS INDICATED FROM AUTHENTIC RECORDED TESTS.

14° SAFETY ANGLE

SMOOTH IRON—SOAPY
SMOOTH CONCRETE—COVERED WITH ALEMITE
WAXED HARDWOOD—DRY
LINOLEUM—DRY
LINOLEUM—WET
SMOOTH IRON—DRY
TERRAZZO—DRY, SMOOTH CONCRETE—WET
WAXED HARD WOOD—WET
TERRAZZO—WET

SELF SHARPENING SPIKE FOR ICE SNOW, GRAVEL ETC.

ALSO AVAILABLE—NON-SPARK LADDER SHOES FOR REFINERIES, GRAIN ELEVATORS, MUNITIONS PLANTS AND ALL INDUSTRIES WHERE SPARKS ARE A HAZARD.

OTHER Safe-Hi LADDER ATTACHMENTS

POLE GRIP HOLDS TOP OF LADDER ON ANY POLE, PIPE OR CORNER.

WALL GRIP HOLDS TOP OF THE LADDER SECURELY ON ALL SMOOTH WALLS.

ROSE MANUFACTURING CO.
2700 W. BARBERRY PLACE
DENVER 4, COLORADO

Safe-Hi DENVER

Make your plant safer with "SAFETY-WALK"

Here's the new mineral-coated fabric that provides perfect traction—sure footing—even under *water or grease!* Patterned in strips, tiles and cleats for a variety of purposes, it goes on in minutes—lasts for years. And it's easy to keep clean! Use "Safety-Walk" Non-slip Surfacing on stairs, walkways, ramps—wherever the danger of a fall is present. "Safety-Walk" pays off in accident prevention, better public and employee relations . . . prevents costly claims.

REG. U.S. PAT. OFF.
SAFETY-WALK
BRAND
NON-SLIP SURFACING

PRODUCT OF 3M COMPANY RESEARCH

Made in U.S.A. by MINNESOTA MINING AND MFG. CO., St. Paul 6, Minn. Export Sales Office: 99 Park Avenue, New York 16, N. Y. In Canada: P. O. Box 757, London, Ontario.

FREE SAMPLE! Please send me "Safety-Walk" sample and complete information.
MINNESOTA MINING AND MFG. CO.
Dept. LB-38, St. Paul 6, Minn.

NAME .....
COMPANY .....
ADDRESS .....
CITY ..... ZONE .... STATE .....

Circle Item No. 22—Reader Service Card

According to the National Safety Council, falls kill about 55 persons *every day* — only traffic accidents cause more accidental deaths. One important factor in falls — slippery floors — can be eliminated if you use Wyandotte ZORBALL.

Stop falls caused by slippery floors— use ZORBALL all-purpose absorbent!

USE WYANDOTTE ZORBALL FOR:

Safer walking — ZORBALL keeps floors safe longer, protects workers.

Safer driving — ZORBALL provides better traction for lift trucks and rolling equipment.

Fire protection — ZORBALL is nonflammable, even when saturated with oil.

Steps and ramps — ZORBALL prevents falls in these dangerous areas.

Safety outdoors — ZORBALL skidproofs driveways and loading platforms.

Survey results are *shocking*: "Falls kill 19,000 a year!" . . . to say nothing of the serious injuries, the lost time, the lost work—

That's why it pays to be careful when it comes to floor safety: to avoid slipperiness due to oil, grease, water, or *any* liquids. These are *unnecessary* hazards that Wyandotte ZORBALL, the nonskid floor absorbent, eliminates with an effectiveness that is truly amazing!

ZORBALL absorbs oils, grease, whatever is making your floor slippery. ZORBALL keeps floors safe longer, because its rugged, angular particles resist breakdown. Actual crush tests prove ZORBALL remains effective more than twice as long as ordinary floor absorbents. ZORBALL is the safest, lowest use-cost floor absorbent on the market today!

Remember: the worst accidents are those that could have been prevented. Make sure *your* floors are safe with ZORBALL. Talk to your Wyandotte jobber or representative now! *Wyandotte Chemicals Corporation, Wyandotte, Mich. Also Los Nietos, Calif. Offices in principal cities.*

Wyandotte CHEMICALS

J. B. FORD DIVISION

Circle Item No. 23—Reader Service Card

warnings as failure progresses gradually.

Laminated ladders are available in single and two-section extension ladders and several specialized types.

Light metals. Aluminum and magnesium alloys are light in weight and resistant to moisture. In case of overload there is deflection warning instead of sudden breakage. Prices are higher than for wooden ladders.

Metal ladders should be free from sharp edges and burrs on the side rails. Soft metal rivets that might shear off under load should not be used.

Metal ladders are conductors of electricity and should not be used around electrical equipment. Decals or painted warnings against such use should be carried on all metal ladders.

Single, extension, stepladders, platform ladders, and planks, stages and hangers are available in light metals.

Glass fiber and plastic. A new type of light-weight ladder uses a sandwich construction of glass fiber and polyester resin. Advantages claimed are high strength-to-weight ratio, non-conducting qualities and resistance to corrosion. Glass fiber reinforced side rails are plastic welded with aluminum or magnesium rungs to form an integral part of the ladder.

Standard single ladders, 8-16 ft. and extension ladders 16-28 ft. weigh approximately 2 lbs. per ft. In the heavy-duty grade single ladders 8-20 ft. weigh 2¼ lbs. per ft. and extension ladders 2½ lbs.

Stepladders are available in lengths up to 20 ft. Three types are listed by the Code:

I. Heavy duty—4 to 20 ft.
II. Medium duty—4 to 12 ft.
III. Light duty—3 to 8 ft.

More substantial construction is, of course, specified for the longer, heavier duty ladders.

The front section should have level treads when in the open position.

The rungback stepladder permits a helper to assist from the back of the ladder.

A spreader or locking device of sufficient size and strength to hold front and back sections securely in the open position is important.

A bucket shelf is useful for many jobs. It should support a load of 25 lbs. and be fastened so that it can be folded up when the ladder is closed.

Platform (safety) ladders are a development of the stepladder. They provide a solid working platform guarded on three sides.

Safety ladders are usually built for heavier duty than the ordinary stepladder.

Height to platform ranges from 3 to 18 ft., over-all height being 2 ft. more.

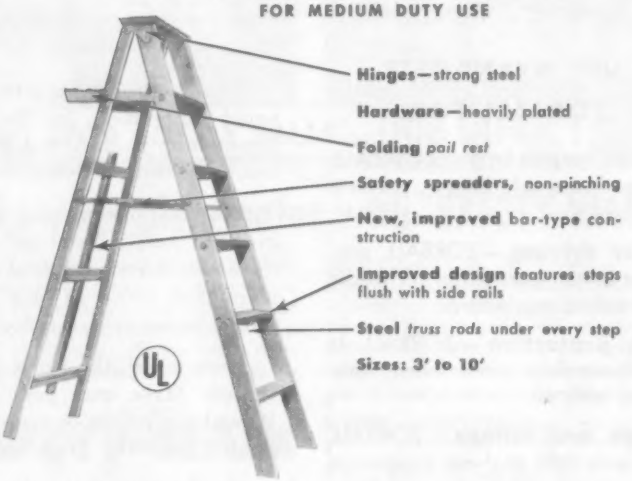
Single ladders up to the maximum length of 30 ft. specified by

BEST GENERAL-PURPOSE LADDER BUY . . .

Low-Cost, Quality-Built "GOLD MEDAL"®

"SAMSON" STEP LADDERS

FOR MEDIUM DUTY USE



Last Longer—cost less to use
More safety and design features

"Gold Medal" Ladders are carefully manufactured of only the best, selected materials. Special features provide maximum strength and safety in use, convenience in storage and light weight for easy handling. Their longer life means lower over-all ladder costs to you.

PS Co's nation-wide sales organization is thoroughly experienced in helping you get the *right* ladders for your needs. Reach your local representative through your 'phone directory under ladders, "Gold Medal".

FOR GREATER SAFETY...EFFICIENCY...ECONOMY

THE PATENT SCAFFOLDING CO., Inc.

38-21 12th Street, Dept. NSN, Long Island City 1, N. Y.
1550 Dayton Street, Chicago 22, Ill.
Branches in All Principal Cities

This is only one of a complete line of "Gold Medal" Wood Ladders *quality-built* for greater safety, efficiency and economy of use. Included are: Step Ladders for electricians, painters, carpenters and other trades; Heavy-Duty Step Ladders; Single and Extension Ladders and Platform Stages. Write for Catalog L-71-RR.

Circle Item No. 24—Reader Service Card

the Code are available. For sizes larger than 24 ft., extension ladders are easier to store and transport.

Sectional size of rails varies with the length of the ladder and diameter of rungs increases with the width of the ladder between side rails.

Diameter of rungs should be not less than 1⅛ in. Holes for rungs may extend through the side rails or be bored to give at least 13/16 in. of bearing to the rung tenon.

Oilers' ladders are provided with hooks at the top so the ladder may be securely fastened to overhead shafting.

Extension ladders. Two-section extension ladders up to 60 ft. in length are recognized by the Code. Specifications for dimensions of side rails and type of wood permitted vary with the length of the ladder.

Minimum overlap for ladders up to 36 ft. is 3 ft.; from 37 to 48 ft., 4 ft.; from 49 to 60 ft., 5 ft.

Smaller side rails on rung-type ladders are acceptable when reinforced by steel wire running the length of the side rails and securely fastened to them.

Locks must be positive in action. Guide irons must be securely attached to the ladder and so placed as to prevent the upper section from tipping or falling out while raising, lowering, or in use.

Rope and pulley for raising and lowering, while not mandatory, are desirable.

Trestle ladders of the "A" type (with a center section which slides up and down) are used in maintenance work. These ladders are commonly used in pairs with a stage between them or in sets of four with two stages and with planks from stage to stage.

Points to be considered in selecting extension trestles are guides of adequate length, strong locks of the sliding section, and a safety spreader.

Telescoping ladders are mounted on rubber-tired ball-bearing wheels with floor locks. Maximum height of working platform is 15 ft. When down, it will go through an ordinary door or into an elevator.

Telescoping towers reach still greater heights. These portable units can be extended up to 49 ft. The man on the platform controls the travel through an electric push-button system. Another push-button control is located on the frame below but the man above can lock the platform in place by pressing a safety button. Outriggers give stability.

Chain and rope ladders are for emergency use as a means of escape in case of fire or explosion, and for rescue work where rigid ladders cannot be used. These are not substitutes for permanent fire escapes.

Crow's nest ladders. For many outdoor maintenance jobs the

SPEED OFF-THE-GROUND WORK

WITH PATENT SCAFFOLDING CO., INC.

ALUMINUM Ladders and Rolling Scaffolds

LIGHT • STRONG • SAFE • LAST LONGER • EASIER-TO-HANDLE

New HEAVY DUTY SAFETY PLATFORM STEP LADDER—Non-slip platforms and steps, safety corrugated. 14½" x 18" platforms, 2' from top. 3¼" wide steps. Rubber feet on both front and back. Heavy duty rear rungs. Platform heights, 3' to 12'. *Write for Bulletin L-88.*

EXTENSION LADDERS—Easily adjusted, self-locking, 16' to 40' lengths. SINGLE LADDERS from 8' to 20'. *Write for Catalog L-71RR.*

4'6"-WIDE LADDER SCAFFOLDS—Large platform area with two available working levels. Heavy duty wheel, dual-brake steel casters. Spans of 6', 8', 10'. Built-in ladder. Easily added sections increase height. *Write for Bulletin AS-7.*

29"-WIDE LADDER SCAFFOLDS—Same features as 4'6"-wide scaffolds. Fit through 30" doorways. *Write for Bulletin AS-7.*

IMMUNE TO RUST • ROT • MILDEW • CORROSION RESISTANT

P. S. Co's nation-wide sales organization is thoroughly experienced in helping you get the *right* ladders or scaffolds for your needs. Reach your local representative through your 'phone directory under ladders or scaffolds, "Gold Medal."

FOR GREATER SAFETY...EFFICIENCY...ECONOMY

THE PATENT SCAFFOLDING CO., Inc.

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1550 Dayton Street, Chicago 22, Ill.
Branches in all Principal Cities

Circle Item No. 25—Reader Service Card

Circle Item No. 26—Reader Service Card

How do YOU clean an ENGINE BLOCK?
AUTOMATIC
POWER AGITATED
HOT TANK
Hot wash an entire engine block or 200 lbs. of Parts
FAST!
DOES IN MINUTES WHAT FORMERLY TOOK HOURS!
Kleerflo
POWERMASTER DEGREASER
Rapid vertical strokes of the motor-driven rack create a washing pressure in the heated cleaning compound, flushing off grease and grime without mess.
HI-T GREASE OFF
RECOMMENDED CLEANING COMPOUND!
The Kleer-Flo POWERMASTER is equipped with a powerful gas immersion type heating unit which works equally well with natural, manufactured or bottled gas.
CAN BE USED AS A COLD WASHER TOO!
CALL, WIRE, WRITE FOR INFORMATION
America's Foremost Producer of Parts Cleaning Equipment
PRACTICAL MFG. CO.
2840 4TH AVE. S. • MINNEAPOLIS, MINN.

"PROTECT YOUR CLIMBERS"

With Johnson All Rubber Ankle Action Dielectric Ladder Shoes. The Choice of Ladder Climbers in all parts of the world.

WORK SAFELY ALL-WAYS

Our Step Ladder Shoes are popular with maintenance men in homes, office buildings, schools, hospitals and etc. Dealers in all principal cities. Ask your Safety Supply Dealer or send direct. Your order will be shipped promptly.

JOHNSON LADDER SHOE INC. EAU CLAIRE, WISCONSIN

Circle Item No. 27—Reader Service Card

"crow's nest" ladder mounted on a truck is used. It is an extension platform ladder, securely mounted on the vehicle, which can be rotated in a complete circle and elevated at angles from 45 to 72 degrees from the vertical.

This device permits working over parked vehicles and is used for tree trimming, servicing street lights, police and fire alarm signals, inspecting overhead lines, connecting house services, and general emergency work. It can be lowered into compact form for traveling.

Accessories

Ladder shoes. Whenever a portable ladder is used on anything but dry ground, there is possibility of the feet slipping. To overcome this hazard, several types of ladder shoes have been devised. They grip the surface by sharp points or by friction.

One type of sharp point is the metal spike; another is the abrasive shoe. The friction type depends upon frictional resistance for the gripping qualities of cork, lead, and rubber or neoprene with interwoven cord.

Another type made of cotton asbestos material and interwoven wire combines the two principles. Suction cups are used in still another type.

Ladder shoes become less effective through wear, especially when exposed to oil and grease on the floor. Consequently, they should be inspected regularly.

Stabilizers. When a ladder is used on an uneven surface, hydraulic stabilizers attached to the feet keep a ladder firm and steady. These can be attached to any straight or extension ladder.

Maintenance

Inspection. Look for: Loose rungs or steps; screws, bolts, and

References—Ladders and Scaffolds

National Safety Councils: Accident Prevention Manual for Industrial Operations, 1955.

—Ladders, Aluminum and Other Metal; Safety Reprint Gen. 7.

National Safety News: Facts and Fancies About Ladders; L. J. Markwardt and Alan D. Freas, Feb. 1950.

—Protecting Wood Ladders from Decay; Feb. 1950.

—Rolling Scaffolds; July 1951.

—Safer Maintenance with Swinging Scaffolds; May 1952.

—Safe Ladders Safely Used; L. J. Markwardt, May 1956.

—Code Sets Standards for Fixed Ladders; Robt. L. Moore, May 1957.

American Standards Assn.: Ladders, Safety Code for Construction, Care and Use of, A14.1-1952.

—Portable Metal Ladders; Safety Code for, A14.2-1956.

—Fixed Ladders; Safety Code for, A14.3-1956.

other metal parts broken or missing; cracked or broken uprights, braces, steps or rungs; slivers; worn or damaged shoes.

Defective ladders should be marked and taken out of service until defects have been corrected. If beyond repair, they should be destroyed promptly.

Records of the condition of each ladder should be kept.

Storage. Ladders should not be stored where they will be exposed to weather, nor near radiators, stoves, or steam pipes.

Protective Coatings

Two coats of linseed oil or spar varnish will increase resistance to weathering.

Painting is permitted by the ASA Code, if ladders are inspected before painting by experienced inspectors acting for the purchaser and ladders are not for resale. Transparent coatings, however, are preferred by many users.

Wood preservatives, which consist of toxic chemicals in non-aqueous solution, prolong the life of wood exposed to weather or in contact with the ground. They offer special protection at the joints or rung holes and tenons.

Preservatives of the NSP type (non-swelling, paintable) do not interfere with subsequent painting and varnishing. * * *

There's a BIG difference in floor absorbents

MAKE THIS DISCOVERY!

RIGHT IN YOUR OWN OFFICE you can test the difference of Eagle-Picher Industrial Floor-Dry with whatever oil absorbent you're now using. You'll discover it actually absorbs as much as 100% or more liquid per pound than other floor drying materials.

YOU'LL ALSO PROVE that Eagle-Picher Floor-Dry retains its skid-proof granular mineral form even when saturated. It doesn't mud or pack. Light in weight, it spreads easier and covers a larger area. Non-combustible, it has no chemical reaction. And possessing unusual reflective power, Floor-Dry makes working conditions bright and pleasant, as well as safe!

Since 1843 EAGLE EP PICHER

WRITE TODAY. Our Eagle-Picher representative will bring the portable laboratory to your office where you may make this test yourself. The Eagle-Picher Company, Cincinnati 1, Ohio.

Circle Item No. 28—Reader Service Card

Safe Scaffolds

SCAFFOLDS of many types are required in construction and maintenance work. These range from sectional steel scaffolds erected on large building jobs down to movable work platforms used for many maintenance jobs indoors and out.

Types of scaffolds. Three principal classifications are:

1. **Built-up**—Sectional frame; tube and coupler.
2. **Hanging**—Heavy-duty suspended; light-duty swinging.
3. **Rolling**—Movable units made by fitting casters to built up scaffolds or to special aluminum components.

Every scaffold and its supporting members should have a factor of safety of at least 4.

EQUIPMENT FOR REACHING VARIOUS HEIGHTS

TYPE OF EQUIPMENT	Up to 12 ft.	12 to 18 ft.	18 to 30 ft	Above 30 ft.
Catwalk or truss	—	—	X	X
Crane (where available)	—	—	X	X
Crow's nest ladder	—	—	X	—
Disconnecting hanger	—	—	X	X
Portable maintenance platform	—	X	X	—
Relamping bridge	—	—	X	X
Stepladder	X	—	—	—
Straight ladder	—	X	—	—
Telescoping platform, elevating tower, etc.	—	X	X	—

Tubular steel scaffolds are used on large jobs where work will be carried on at great heights. Scaffolds may be purchased or rented. When rented, their erection and dismantling by experienced crews usually is included in the contract.

Steel scaffolds, except for the wood planks, are noncombustible. They offer less resistance to wind than all-wood scaffolds. Interchangeable parts make the scaffolding adaptable to many jobs and facilitate erection and dismantling.

Rolling scaffolds can be erected from sectional steel scaffolding components or tube-and-coupler scaffolding components and fitted with casters. There are three other types of rolling scaffolds:

1. Sectional ladder scaffolds of steel or aluminum.
2. Sectional aluminum scaffolds with interior or exterior stairway.
3. Scaffolds made of folding one-piece sections.

let us **PROVE** ALDEK ALL-ALUMINUM SCAFFOLDS ARE SAFER AND MORE EFFICIENT

Factory-trained field representatives are ready to show you ALDEK rolling stairway, span and mobile bridge scaffolds in action... ready to prove they are safer to use, easier and quicker to erect. Since ALDEK is so easy to store and transport, the demonstration can be held at any working area you select.

A. ALDEK mobile bridge scaffolds give exceptional clearance... adjustable support poles provide a level working platform regardless of floor incline.

B. ALDEK stairway and span scaffolds require only 1 man assembly—put workmen at the right working level with ample room to move around.

Write for demonstration and literature

ALUMINUM Safety PRODUCTS, INC.
DEPT. NS-3, 289 FIFTH AVENUE, NEW YORK 16, N. Y.

- Non-sparking
- High strength, aircraft-type aluminum
- Instant action, positive locking, adjustable legs
- Ball bearing, rubber tire, locking casters

Circle Item No. 29—Reader Service Card

These workstands provide more space than a platform ladder, permit more than one man to work and provide more space for tools.

Workstands of the wheelbarrow type can be moved easily by one man.

Telescoping portable towers are used for some maintenance work.

Caster locks should be provided on movable equipment to prevent movement while in use.

Swinging scaffolds are light-duty equipment primarily for men and hand tools. They are used for painting, tuck-pointing, glazing and other operations where scaffold height is adjusted frequently as work progresses.

A swinging scaffold should be hung securely from eaves, cornices, or other reliable support, with strong hooks. Anchorage should be inspected before hooks are placed.

Ropes should be of the best grade manila not less than ¾ in., on at least 6-in. blocks.

Steel cable should be not less than 5/16 in. Steel cable is wound on a drum, not pulled by hand.

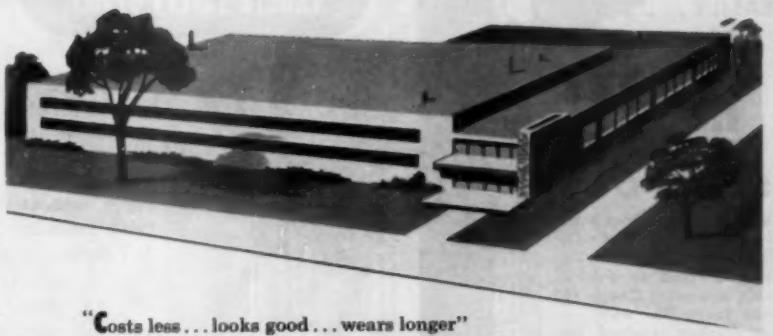
A safety belt and a life line extending from the roof to the ground should be worn by workers on a swinging scaffold. The safety belt rope should be tied to the life line with a triple sliding hitch.

Suspended scaffolds are supported by outrigger I beams attached to the frame of the building. They are recommended for use on buildings more than 5 stories high which have a frame to provide the overhead support. The scaffold is raised and lowered by steel cable operated by a winch.

Shackles or beam clamps holding cables should be securely fastened to outriggers with a stop bolt in the outer end of each outrigger. Cables should be securely fastened to outriggers and to the putlogs which carry the platform, or to the hoisting machines.

Ladder-jack scaffolds are used chiefly by painters and electricians. They should not be used more than 22 ft. above ground or floor or on extension ladders. An unsupported span should not be more than 10 ft.

Only 10¢ a foot BUYS Sure-Foot protection for your plant!



"Costs less . . . looks good . . . wears longer" —that's what they're saying about Sure-Foot non-slip abrasive floor coating.

Sure-Foot costs less than 10¢ a square foot for 2 coats—including application. Applied by brush, roller or squeegee, Sure-Foot flows on easily covering smooth or uneven surfaces—wood, concrete or metal. It dries overnight to a tough, hard, non-skid finish that lasts for years.

Applications of Sure-Foot are unlimited. On plant premises, equipment, machinery or manufactured products, wherever there's a slipping hazard, paint on protection *economically* . . . with Sure-Foot.

Sure-Foot is available in eye-easing gray, red, black and green as well as traffic yellow. For plant zoning, Sure-Foot traffic yellow can't be beat. It's super-tough . . . *lasts 3 to 4 times longer than ordinary zoning paints!*

SURE-FOOT DISTRIBUTORS

Central Chemical Co.
Dallas 1, Texas
Coastal Plains Supply Co.
Shreveport, La.
Continental Safety Equipment Co.
St. Paul 4, Minnesota
Dayton Safety Supply
Dayton 2, Ohio
Eastman Engineering Company
Green Bay, Wisconsin
Guardian Safety Equipment Co.
Philadelphia 4, Pennsylvania
Guardian Safety Equipment Co.
Tulsa 4, Oklahoma
(Branch, Dallas, Texas)
Guardian Safety Equipment Co.
Orange, New Jersey
Guardian Safety Equipment Co.
Houston 19, Texas
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Universal Safety Equipment Co.
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FROST PAINT & OIL CORPORATION 1209 N.E. TYLER MINNEAPOLIS 13, MINNESOTA

Circle Item No. 30—Reader Service Card

Railings and toeboards. Most codes require railings on scaffolds more than 12 ft. high, but railings are desirable on lower scaffolds. A top rail should be 36-42 in. above the floor with an intermediate rail halfway between the top rail and the walkway surface.

Toeboards are needed to prevent tools or materials from falling.

Overhead protection, consisting of planking heavy enough to stop any falling object, should be provided for scaffolds when men are working overhead. This protection should be not more than 9 ft. above the working platform.

Sidewalk bridges. Where construction or repair work is carried on over sidewalks, protection for pedestrian traffic is needed. Sidewalk bridges of adequate strength are provided by companies furnishing sectional steel scaffolding. * * *

UP!

UP!

UP!

TO ANY DESIRED HEIGHT

EASILY . . .
SAFELY . . .
ECONOMICALLY

HI-LIFT
EXTENSION
SCAFFOLD

Models extend from 6 ft. 10 in. (can be made lower) to any desired height. Hand or electrically operated. Comes to you ready for work — no erection required, no loose parts. Built to meet individual requirements. Ideal for painting, lighting, cleaning, and all overhead maintenance. Pays for itself in time and labor saving.

Also Makers of
HI-LIFT PORTABLE WORK PLATFORM
and
ATLAS PORTABLE LOADING PLATFORM

Write for Complete Information

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INDUSTRIAL CORP.
866 39th Street
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THE POSITIVE
LADDER SAFETY DEVICE

CLIMBING MADE SAFE!
If climber starts to fall, device locks in a notch automatically, instantly. Holds securely. Limits fall to 7 inches.

PREVENTS DEATH AND INJURIES
— *FROM FALLING*

AUTOMATIC, POSITIVE. Will instantly catch and hold workman if he starts to fall, **even if unconscious.** Requires no attention from climber; he climbs in normal manner. Inexpensive. Easy to install; 3 men can clamp it to ordinary ladder in few hours. Clamps to any rung ladder, peg ladder, pole or framework. No welding or cutting. Notched rail hot-dipped galvanized. Entire equipment rust and corrosion proof. Can be kept free of ice by applying heat inside the carrier rail. In use approx. 10 years. Approved by Safety Engineers and Govt. Agencies throughout country. Patented. Manufactured only by

SAFETY TOWER LADDER CO.
1024 Burbank Blvd. P.O. Box 1052
BURBANK, CALIFORNIA

Circle Item No. 33—Reader Service Card

COTTERMAN
WELDED STEEL SAFETY LADDERS
For Filing Rooms — Stock Rooms — Vaults

SAFE
•
STRONG
•
EASY TO MOVE
•
EASY TO CLIMB
•
NON-SKID STEPS

Frame work made from heavy gauge 1" diameter round steel furniture tubing, with all joints electrically welded. Mounted on Swivel Brake Casters which allow the ladder to be rolled freely when no one is on it. When you step on the ladder the rubber cushioned legs rest on the floor and prevent rolling.

Made in 13 heights—from 12" 1 Step to 117" 13 Step, and in 4 widths—18", 20", 26" and 32", with and without hand and platform rails.

We also manufacture the
COTTERMAN TRUCK - N - LADDER
A Truck and Ladder combined in a single unit.

Write for Folder No. 58-N for complete information and prices on both these items.

Manufactured by
I. D. COTTERMAN
4535 N. Ravenswood Ave. Chicago 40, Ill.

ATTENTION: SAFETY DISTRIBUTORS

DRI-RITE WATER, OIL AND GREASE ABSORBENTS

Dries and cleans floors—Absorbs water, oil and grease—Eliminates scrubbing. Prevents slipping accidents.

Dri-Rite quality absorbents have been proven in use by large and small industrial plants for many years.

Write for Information on Our Exclusive Distributor Plan

The DRI-RITE COMPANY
100 W. Chicago Ave., Chicago 10, Ill.

Circle Item No. 222—Reader Service Card

IN SECTION 3:

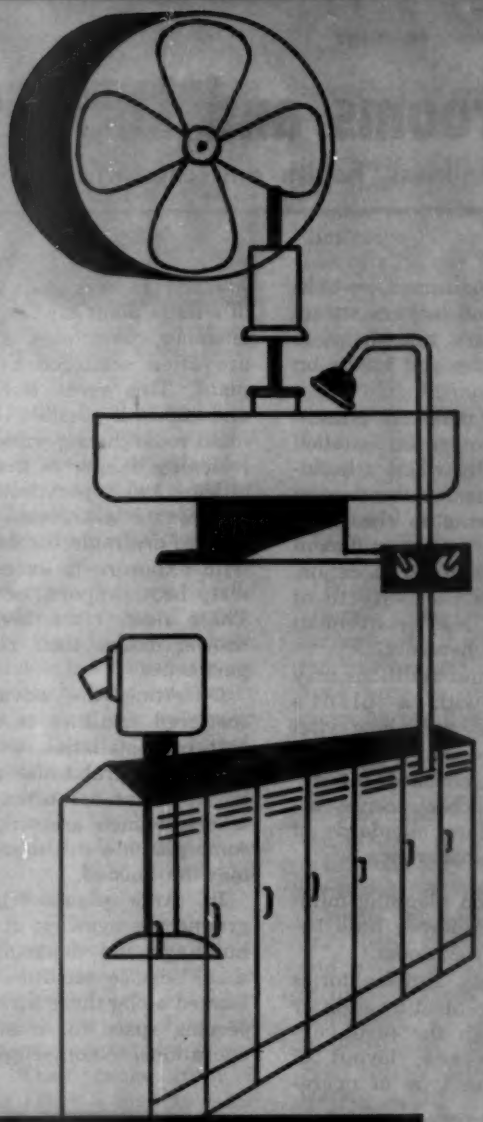
Washrooms and Lockers 48
Industrial Ventilation 50
Skin Infections 52
Safety with Solvents 56
Heat and Humidity 59
Drinking Water 62
Food Service 66

HEALTH ENGINEERING might be called an advanced and specialized form of housekeeping—a combination of sanitary, chemical, and mechanical engineering.

Harmful exposures to be controlled include dusts, gases, vapors, and other air contaminants; extremes of temperature; radiant energy; and excessive noise.

Research in occupational hygiene has been stimulated by the extension of compensation to cover disabilities attributed to these exposures.

The industrial hygienist and the safety engineer have a common interest in personal services, such as sanitary facilities, food service, and drinking water, as well as in the prevention of occupational diseases.



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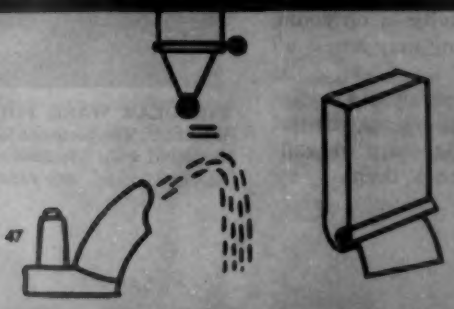
INDUSTRIAL HEALTH ENGINEERING



Washrooms and Lockers

Promote cleanliness, health and comfort

CLEAN, well-equipped washrooms, toilets, and lockers attract desirable workers and help to keep them healthy and happy on the job.

Facilities for personal cleanliness and hygiene can be installed most economically when a building is constructed. Attention to these requirements in the planning stage will insure sufficient space and convenient location. Later it may be necessary to fit facilities into less convenient space and at higher cost.

But changes and additions may be necessary with a plant's growth. A survey will show what changes are needed. Equipment should also be checked for deterioration and obsolescence according to modern standards of sanitation and appearance.

Location. Good planning minimizes loss of employee time between job and washroom.

Lockers, toilets, and lavatories may be in one central location or scattered through the plant, depending on its size, layout of departments, and type of operations.

In smaller plants, washrooms and lockers are usually near the entrance.

Toilets and lavatories should be not more than 200 ft. away from any work place. In multistory buildings, one on each floor is desirable. If that is not practicable, they should not be more than one floor above or below the work place.

Washrooms in large one-story buildings usually are scattered throughout the building. Where there are many small isolated buildings, as in chemical plants and railroad yards, or where much of the activity is outdoors, a separate building may house all these facilities.

Accommodations should be located so that employees will not have to cross highways or railroad tracks to reach them.

When lockers and washrooms of a large plant are near the main entrance, lavatories and toilets are often scattered through the plant. This saves workers' time and makes it possible to close the main room during working hours, lessening danger of theft and requiring less supervision.

Separate washrooms and lockers are desirable for departments with exposure to excessive dust, dirt, heat, vapors, or moisture. These need more lavatories or shower baths than cleaner departments.

Offsetting the advantages of scattered facilities is the higher cost of installation and maintenance. Central toilet and washing facilities are often preferred where women are employed. In some plants a full-time attendant may be needed.

In large plants with underground passageways connecting buildings and departments, personal service facilities are often located along these corridors, conserving space for manufacturing operations. Another space-saving method is to locate facilities on balconies.

Light. Fixtures should provide sufficient light in all parts of the room. Walls, ceilings, and partitions in white or light colors conserve light and encourage cleanliness.

Ventilation. Unless the washroom has sufficient outside windows for natural ventilation, forced ventilation will be needed.

Floors, and walls to a height of at least 6 in., should be of impervious material, such as glazed tile or concrete with good friction characteristics.

Walls should form a tight joint at the floor level, or there should be a cove base at least 6 in. high. Walls should be impervious to water to a height of at least 5 ft. Wall and ceiling surfaces should be washable.

Wash Fixtures

Group washing equipment. In industrial plants, institutions, schools and other establishments where facilities must be provided for large groups, circular wash fountains are the most frequent choice.

Eight to 10 users can be accommodated at a 54-in. circular fountain and 5 to 6 at a 36-in. unit. Fewer valves and plumbing con-

CIRCULAR WASH FOUNTAINS are the most widely used fixtures for group washing. Temperature of water can be controlled and dispensers for powdered or liquid soap attached. In the background are lockers with sloping tops which are easier to keep clean than flat tops. (Du Pont).

nections mean additional economies in installation and maintenance.

Economy of water is another advantage. Several persons washing at a circular fountain use little more water than one at an individual basin. Each user washes in clean running water of regulated temperature. A foot or hand-controlled mechanism regulates the flow.

Semi-circular units 36 or 54 in. wide mounted against a wall are used for narrow or irregular washrooms.

Precast stone and marble are the most frequently used materials. Some models are also available in enameled iron and stainless steel.

Individual basins of vitreous china or enameled iron make an attractive installation where comparatively small groups are to be accommodated.

Mixing faucets are better than separate faucets for hot and cold water. Hot and cold handles should be plainly marked, with the hot water valve always on the left side. Thermostatic control of water temperature is a desirable safeguard.

Avoid stoppers. Faucets should permit washing in running water.

Enameled troughs may be used where first cost is a consideration. Over these are hot and cold water pipes with mixing faucets spaced not less than 24 in. apart. Double-width troughs, or single-width troughs back to back, save space.

Spray heads at basins or troughs should be high enough to permit washing head, arms and shoulders under the spray.

DISPENSER for waterless cleaner and paper towels. (Dameron Enterprises)

Showers are needed in many industries, particularly where operations are hot or dirty, or where toxic materials are used. Requirements depend upon nature of the processes. They range from 1 shower for every 5 men to 1 for every 15.

Shower installations may be of the compartment or the circular multi-stall type.

Floors and approaches should be of slip-resistant material, such as concrete with an abrasive surface. A curb 4 in. high should be erected around shower stalls, to keep water within the enclosure. With adequate slope to the drain a curb may not be necessary.

Painting the curb a contrasting color helps to prevent tripping.

Emergency showers. Quick-acting showers should be installed at convenient locations where caustics, acids, and other corrosives are handled.

Eye fountains are also desirable where chemicals are handled. Prompt flushing of the eyes is recognized as the best first-aid treatment for any chemical in the eyes.

Fungus infections. Warmth and moisture in shower rooms are conducive to the spread of fungi that cause "athlete's foot." Floors and stalls should be scrubbed daily with detergent and water as a general sanitation measure. A germicide in the scrub water is an added precaution.

Careful drying of the feet and use of an antiseptic foot powder help to prevent infection. Preparations for toughening the skin increase resistance to fungi.

Pans of antiseptic solution have been found ineffective or worse.

Disposable paper slippers or wooden clogs keep the feet from contact with the floor. They need not be worn in the stall where the floor area is kept mechanically clean by the flow of water.

Skin Cleansers

Four types of skin cleansers are in use: (1) Soaps (2) Sulfonated oils (3) Synthetic detergents and (4) Waterless cleansers.

Soaps. Powdered soaps consist principally of powdered hard soap and water softener, to which a scrubbing agent may be added. Cornmeal, a commonly used scrubber, may be coarse or fine. Most soaps can be used with hard water.

Organic solvents, such as naphtha, turpentine, and carbon tetrachloride, should be avoided. Some, particularly carbon tet, are toxic, some are flammable, and all have a drastic defatting action. If they must be used to remove substances like lacquer that resist ordinary cleansers, emollient creams help to offset loss of natural skin oils.

—*To page 68*

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WASHING FACILITIES

No. persons	No. washing facilities
15	1
30	2
50	3
Each additional 25 persons	1

With circular fountains, 17 in. of outside rim equals 1 lavatory. (ASA Code Z4.1-1955)

Industrial Ventilation

Providing clean air for the workplace

VENTILATION, reduced to its simplest terms, means providing clean air for the health and comfort of occupants of an enclosed space. That may involve anything from an open window to elaborate exhaust systems and control of heat and humidity.

Providing the air requirements of the workplace may be complicated by nuisance or toxic air contaminants generated in the industrial processes.

Ventilation problems frequently involve the community as well as the plant buildings. In many areas, gases, dusts, and by-products of combustion cannot be vented to the outside without treatment to make them safe and unobjectionable. Prevention of air pollution is receiving much attention from industry and from public health organizations.

A workplace can be ventilated by either natural or artificial means. Natural ventilation—air circulation through openings in walls unassisted by mechanical equipment—is seldom entirely satisfactory.

Ventilating systems are based on one of two general principles or a combination of the two:

1. **Plenum ventilation.** Air is driven into the room by fans, diluting the room air with fresh air, forcing out stale air through doors, windows, cracks, and crevices. This method has definite limitations.
2. **Exhaust (vacuum) systems.** Air is drawn from a room by fans. Air to replace it enters through doors, windows and other openings because of reduced air pressure in the room.

General Ventilation

Where processes are not injurious to health, general ventilation is usually satisfactory. It is also satisfactory where dilution of air contaminants will keep the concentration below permissible limits for continuous exposure. Standards for many contaminants have been compiled by the American Standards Association.

VENTILATING FANS and the 3-h.p. motors that operate them are housed in louvered enclosures on the roof of a large garage.

Where contaminants are toxic, removal at their source is necessary.

Ventilation is often complicated by the necessity of maintaining a comfortable temperature. Exhausting impure air is usually practicable but in cold weather it may be difficult and expensive to warm large volumes of incoming air.

Natural ventilation is adequate for some buildings housing nonhazardous operations. Air circulation is aided by doors, windows, roof ventilators, and monitors. The number of outlets should be planned for hot weather when the temperature difference inducing the draft is at the lowest point.

Air intakes should be located so that incoming air is properly tempered and does not cause uncomfortable drafts in cold weather.

Artificial general ventilation requires properly located inlets and outlets. Air coming into the room must be uncontaminated and discharge points should be located to avoid recirculation.

Contaminant heavier than air can be removed most effectively through openings at floor level.

Fans and blowers. Both portable and stationary types are useful for increasing circulation of air which affords relief from heat. They are not substitutes for exhaust ventilation where air contaminants should be removed.

For moving large volumes of air blowing is more efficient than suction.

Devices for air circulation become less effective as temperature and humidity rise.

Caution should be used in air movement, particularly with velocities over 200 fpm. When relatively cool air is blown over workers at high velocity objectionable drafts are created.

Removing Dust and Gas

Dust is usually more difficult to control than gases, vapors, mists, and fumes. Dusty operations tend to project particles so that the hood must provide velocities sufficient to draw them into the exhaust system.

—*To page 70*

Switch to Morton Yellow Salt Tablets for fast relief without feeling ill!

You and your employees will like Morton Yellow Impregnated Salt Tablets. These are non-sickening salt tablets, made by a special patented process that uniformly coats the individual salt crystals to control the dissolving rate of the tablet. This controlled dissolving rate means that essential body salt lost through perspiration begins to be replaced, immediately but at a gradual, non-nauseating rate.

When there's danger of Heat Fatigue, workers feel better, work better and more safely, when they take Morton Yellow Impregnated Salt Tablets. Remember, they do not cause stomach upset.

Complies with Federal Specifications SS-S 31f for Type III, Class C Impregnated Salt Tablets. U.S. Patent No. 2,665,236. Patented 1954 (Canada) No. 501,316.

Morton Yellow Impregnated Salt Tablets come in a handy Disposable Dispenser. A plastic dispenser and a golden heavy duty aluminum dispenser also are available, as are plain salt tablets.

Mail coupon today for more information!

Name_____
(Please Print)

Title_____

Company_____

Address_____

City_____ Zone_____ State_____

MORTON SALT COMPANY

INDUSTRIAL DIVISION

Dept. NS-358, 120 So. La Salle Street
Chicago 3, Illinois

Circle Item No. 34—Reader Service Card

Occupational Skin Infections

A widespread and perplexing problem

SKIN INFECTIONS are a problem in every industry. Even substances normally harmless will cause irritations of varying severity in some skins. These ailments have been blamed for some 60 per cent of all compensation claims for occupational diseases.

While rarely a direct cause of death, these infections cause much discomfort and are often hard to cure. The patient may also develop a difficult mental state.

Skin irritants are classified under 5 main heads:

1. **Mechanical agents**—friction, pressure, trauma.
2. **Physical agents**—heat, cold, radiation.
3. **Chemical agents**—organic and inorganic, subdivided according to their action on the skin as primary irritants and sensitizers.
4. **Plant poisons**—several hundred plants and woods can cause dermatitis; best known is poison ivy.
5. **Biological agents**—bacterial, fungus, parasitic.

Types of Infection

There are two general types of skin infections:

1. Primary irritation dermatitis. Practically all persons suffer skin irritations from acids, alkalis, irritant gases, and vapors, and from physical agents such as heat, cold, and friction. Brief contact with a concentrated primary irritant or prolonged exposure to a lower concentration results in inflammation.

Allergy is not a factor in these conditions.

2. Sensitization dermatitis is the result of skin sensitivity to a given substance. This form requires a definite period of sensitization. During this period the offending substance causes no response unless there is contact with concentrations high enough to cause primary irritation.

Once sensitization develops, even small amounts of the material may cause symptoms.

Some substances can produce both types of dermatitis. Among them are organic solvents, formaldehyde, and chromic acid.

Cutting Oils

Cutting oils and compounds are frequently involved in occupational skin infections. The condition starts with irritation of the skin by continual contact with the oil, forming comedones or blackheads. These comedones later become infected to form oil pimples or boils.

Dirty workers working in dirty oil form a combination that often results in serious conditions. Some types of skin are more susceptible than others, but anyone will develop the condition with sufficient exposure.

CUTTING OILS AND COMPOUNDS
Skin Troubles

You may be troubled with rash, pimples, or boils if you permit your skin to become plugged with dirt and oil.

1. When quitting work at noon and at night, scrub your hands and arms thoroughly with soap, warm water, and a soft brush.
2. After each washing, rub lanolin or petroleum jelly or other ointment on your skin to prevent chapping.
3. Keep a soft brush and soft towel handy for your own use.
4. Do not wipe your hands with waste; metal particles on your skin or in the waste may scratch you.
5. Have your work clothes laundered at least once a week.
6. Never spit in the oil pans or reservoirs or otherwise contaminate the cutting fluid.
7. Get first aid promptly for all cuts and scratches.
8. Report to your foreman at the first sign of skin irritation.

SAFETY Instruction Card No. 304.

If other precautions are taken, use of protective creams will help, primarily by making it easier to cleanse the skin.

Keep machines and the area around them free from loose oil.

Oil should be changed and the machine thoroughly cleaned after each 120 hours of use, or oftener. Oil may be reclaimed or replaced, depending on which is cheaper.

If reclaimed, it may be sterilized by heat during the process. Caution should be used in adding germicides to oil. Most of them are irritating in excessive amounts.

Oil dermatitis occurs most often on the front of the thighs and the back of the neck, where clothing rubs, also on forearms and wrists where direct contamination is heaviest. Men working in the area must keep clean and not wear oil-soaked clothing.

Men should be encouraged to bathe at the end of the shift. A shower with warm water, mild soap or detergent, and a soft brush is helpful in the control of skin infections.

Predisposing factors. In investigating causes of skin disorders, the following should be considered:

1. Race of patient.
2. Type of skin.
3. Age.
4. Sex.
5. Degree of perspiration.
6. Personal habits of cleanliness.
7. Pre-existence of skin disorders and allergic states.
8. Diet.

General Precautions

Prevent or reduce contact with known irritants wherever possible. Use of enclosure or mechanical methods of handling will reduce skin contacts.

Watch housekeeping around processes.

Provide personal protective equipment—gloves, aprons, face shields, protective creams, etc.

Encourage personal cleanliness which shortens contact of irritants with the skin.

Select a cleanser which can be used by most persons. Some sensitive skins may require special cleansers. * * *

PAX® Costs LESS where Cost Counts MOST...

the Lowest Cost per Wash-up

PAX-LANO-SAV Heavy Duty

The Aristocrat of All Granulated Skin Cleansers

PAX®

G. H. PACKWOOD MANUFACTURING CO.
Manufacturing Chemists
1553 Tower Grove Avenue • St. Louis 10, Missouri

RESEARCH - PROGRESS integrity PAX VALUE - SERVICE

PAX products also include WATERLESS SKIN CLEANSING CREAMS, LIQUID TOILET SOAPS, SPECIALIZED SKIN CLEANERS both LIQUID and CREAM, BAR SOAPS, LANOLIN and SILICONE PROTECTIVE LOTIONS and DISPENSING EQUIPMENT.

59-C

Circle Item No. 35—Reader Service Card

The
LOOKING GLASS
FINISH
TELL TALE
style...
WITH "VERI-FIRE"
PERFORMANCE TRACER
PATENT PENDING
A STARTLING NEW FLOOR FINISH THAT IS BOTH VISIBLE and INVISIBLE
...STYLE'S LOOKING GLASS LETS YOU SEE APPLICATION, WEAR and REMOVAL
THRU VESTAL RESEARCH . . . ANOTHER NEW PRODUCT FOR BETTER MAINTENANCE

Circle Item No. 36—Reader Service Card

END DECEPTION

Your eyes can be easily deceived. They'll see a high gloss on floor finishes when the gloss really is on the floor itself; they'll tell you one finish lasts as long as another when there's a big difference in the wearing qualities of the two; they'll mislead you into believing your floors are well protected when the floors aren't protected at all.

Why? Because the thin film left by floor finishes can't be seen. It's transparent. That's why the gloss you see may be a shine on bare tiles, not a shine on protective finish.

DON'T GUESS...KNOW

Now for the first time new tell-tale STYLE ends the guess work—gives you the true picture of the finish on *your* floors.

New STYLE with the "Performance Veri-fire" is invisible under ordinary light, but when you cast, safe easily-available black light (Long Wave Ultraviolet Illumination) on the new STYLE finish, it immediately glows—*you see* the finish. See the comparative photographs below of the 4 floor tile panels, each under ordinary light and under "black light."

WHAT YOU SEE

UNDER REGULAR LIGHT	UNDER BLACK LIGHT
Leveling appears to be good.	Leveling is actually poor.
Application looks uniform.	Proves application is uniform.
Finish shows no apparent wear.	Finish shows hard wear.
You can only guess if stripping has been complete.	If fluorescence is gone you know stripping has been complete.

What is STYLE?

STYLE is a completely synthetic floor finish consisting of long-wearing co-polymer plastic resins, dispersed in water emulsion form. Producing a longer-lasting, protective finish on floors, it is designed to replace self-polishing floor waxes. It has high water resistance — (permits damp mopping)—yet it is easily removed by ordinary wax stripping methods. A coating of STYLE is dirt-resistant and scuff-resistant—retains its initial brilliance longer than any wax product. This means lower labor costs while maintaining excellent appearance.

How does STYLE'S "Veri-Fire" Work?

Simple, very simple . . . a portable black light is held above the STYLE finished floor. Immediately, like a touch of magic, the looking glass fluorescence in the STYLE finish takes fire and TELLS:

1. If application is *complete* and *uniform*.
2. If good leveling has been obtained.
3. If the finish requires re-application.
4. If there's too much build-up.
5. If stripping has been complete.

Right before your eyes the *true* condition of the floor finish has been positively determined. You can then take the necessary steps as indicated by the black light analysis.

What does this Tracer mean to you?

It means that with the use of STYLE on your floors, you can keep tight control over your maintenance program . . . Eliminate wasted man hours . . . Eliminate excessive use of materials . . . This gives proof positive at all times that you have a quality product. This guarantees dollar savings to you.

Only STYLE Dares to Tell!

Only STYLE can risk the "Veri-Fire" Performance Tracer!

Only STYLE lets you see for yourself!

Look in the Looking Glass!

Without obligation we will send our representative and his "black light" to demonstrate right on your own floor that STYLE *is* a revolutionary product with revolutionary performance control . . . SEEING IS BELIEVING. Just write us on your letterhead. But do it TODAY.

VESTAL INCORPORATED

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WEST COAST PLANT • MODESTO, CALIF.
Vestal Products are Warehoused in all Principal Cities

Safety with Solvents

INDUSTRY uses vast quantities of organic solvents in its processes, and practically all of them are flammable or toxic, or both, in varying degrees. The problem is to select the solvent that will do the job with the least hazard to personnel and property and to surround its use with all possible safeguards.

Safeguards include ventilation, personal protective equipment, fire protection, facilities for personal cleanliness, and medical supervision.

Solvents are used in various manufacturing processes to dissolve pigments, glues, plastics and other materials. Another widespread use is to dissolve soil in cleaning equipment.

Animal and vegetable fats are readily dissolved by alkalis which combine with the fats to form soap, which is washed away with water.

Soil often combines dust, tars, and gums which are most easily dissolved by organic solvents.

Emulsion cleaners have to be used with water, which limits their use. Straight solvents are needed where water cannot be used, as on electrical equipment.

Organic solvents are those which contain the element carbon, and no metallic or basic element. They are classified in four main groups:

1. Hydrocarbons.
2. Alcohols.
3. Esters and ketones.
4. Chlorinated solvents.

In addition to solvent power, other properties may be important to the user. Flash point, toxicity, speed of evaporation and cost must also be considered.

Properties of Solvents

From the standpoint of safety the two most important properties are the flash point and the maximum allowable concentration.

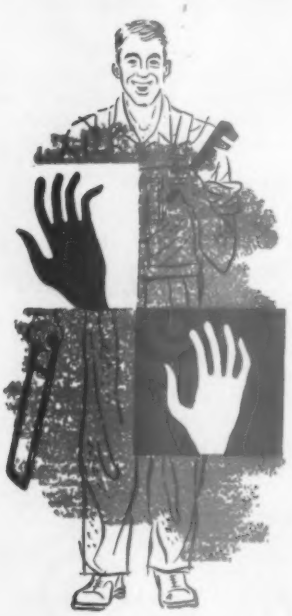
The flash point of a volatile liquid is the ignition temperature of its saturated vapor. Expressed more simply, it is the temperature to which any material must be heated before it will give off sufficient vapor to form an explosive mixture with air.

Flash points given in most tables are determined by the closed cup method. These are always lower than those determined in an open cup.

Toxicity is measured by maximum allowable concentration (MAC) in parts per million (ppm) of solvent that can contaminate the air in a room for extended periods without endangering the occupants. Solvents with higher MAC have lower toxicity.

Speed of evaporation is also an important factor in toxicity. In addition to the rated MAC, the time it takes to reach that con-

IMPROVE EFFICIENCY **PROTECT** YOUR WORKERS



IMPROVE PRODUCTION: Stepan ph-6 is a specially formulated, sulfonated oil, bland skin cleanser . . . amazingly effective in removing oils, greases, and other industrial grime. Lotion-like effect actually protects the skin . . . leaving it clean, smooth, and supple. Stepan also offers a complete line of dispensing methods designed to meet every industrial requirement.

STEPAN PH-6

Neutra-Foam

New mild synthetic skin detergent with excellent foaming properties. Leaves no disagreeable soapy odor on the skin.

Both PH-6 and Neutra Foam are surprisingly economical. Write for literature and samples.

STEPAN CHEMICAL COMPANY
427 W. Randolph St., Chicago 6, Illinois
Telephone STate 2-4711

Circle Item No. 37—Reader Service Card

B R E C K

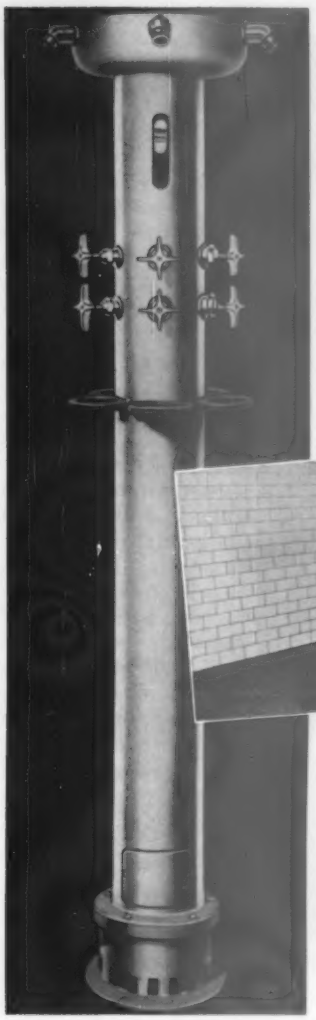
B R E C K H A N D C L E A N E R

Breck Hand Cleaner is an efficient, heavy-duty cleaner which is non irritating and contains no abrasive materials. Breck Hand Cleaner cleans without lathering, and because of its mild yet thorough cleaning action aids in the prevention of skin irritation. About a teaspoonful of Breck Hand Cleaner is applied, without water, to the hands and arms and rubbed in well, followed by thorough rinsing. The excellent penetrating action of Breck Hand Cleaner loosens dirt, grime, and other soils and permits their easy removal in the rinse. Breck Hand Cleaner is formulated to rinse equally well in both hard and soft water. Breck Hand Cleaner has been found especially useful in helping to remove oil, grease, dirt, dust, grime, paint and other soils from the skin.

A Breck Industrial Preparations Booklet will be forwarded to you upon request.

JOHN H BRECK INC • MANUFACTURING CHEMISTS • SPRINGFIELD 3 MASSACHUSETTS
NEW YORK • CHICAGO • SAN FRANCISCO • OTTAWA CANADA

Circle Item No. 38—Reader Service Card



Now!

SHOWER BATHS AT LOWER COST

← *One* Bradley Column Can Provide *Five* Showers

Here Bradley Column Showers are placed in partly walled-in room. Where there is a central floor drain, only two piping connections (hot and cold water) are required.

BRADLEY Multi-Person Shower Units

are economical—each Column provides for 5 showers or for 3 (if placed against the wall). The Columns can be installed alone—or provided with partitions and curtains.

Installation time and expense are reduced because each Column can provide the same bathing facilities as five conventional shower stalls. Only *three* piping connections (hot and cold water and drain) are required in place of *15*. If there is a central drain, only hot and cold water connections are required—a further saving.

Bradley Multi-Stall Showers allow each person to control water temperature and volume as desired. They are ultra-sanitary and require a minimum of maintenance work.

For New or Existing Buildings

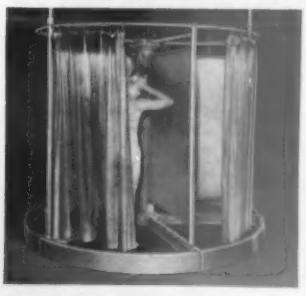
Bradley Showers can be installed readily in new or existing buildings, economically and in shortest time. For complete details and specifications, please refer to pages 22 to 26 of our Catalog 5601, a copy of which will be mailed on request . . .

BRADLEY WASHFOUNTAIN CO.
2237 W. Michigan Street
Milwaukee 1, Wis.

Write for Catalog 5601

Some New Users of BRADLEY SHOWERS

Caterpillar Tractor Co., Milwaukee, Wis.
Dept. of Public Works, Detroit, Mich.
Dominion Magnesium Ltd., Haley, Ont.
Hanna Coal Co., Moundville, W. Va.
Kaiser Aluminum & Chemical, Gramercy, La.
Page Hersey Tubes, Ltd., Wheland, Ont.
J. A. Roebling Son Corp., Roebling, N. J.
Scovill Mfg. Co., New Milford, Conn.
Sheffield Steel Nut & Bolt, Kansas City, Mo.
Volunteer Portland Cement, Knoxville, Tenn.
Wheeling Steel Corp., Benwood, W. Va.
W. K. M. Foundry Div. of A.C.F. Industries, Richmond, Texas



5-stall Bradley shower unit with partitions and curtains—Dayton Daily News.

BRADLEY multi-person SHOWERS

Distributed Through Plumbing Wholesalers

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centration must also be considered. A solvent of low volatility is generally less hazardous than one of high volatility with the same MAC.

Many excellent solvents are not safe for general use. Carbon tetrachloride, for example, is nonflammable but its fumes are highly poisonous. Benzol is too toxic and too flammable for general use.

This discussion is concerned chiefly with liquids used for dissolving grime and grease, rather than those used in complicated chemical processes. For cleaning, a wide range of petroleum hydrocarbons is available. Some are marketed under trade names or numbers. They are relatively nontoxic, with MAC around 500 and flashpoints up to 150 F. Best known of these are the Stoddard solvents with flashpoints of 100-120 F.

It should be assumed that all organic solvents are toxic. If used in any quantities, ventilation determined by an engineer must be provided.

Since solvents dissolve fats and oils, they naturally defat the skin. Workers in these processes should be provided with protective gloves or creams.

Manufacturers of solvents are glad to give the flashpoints and MAC's of their products, also advice on selecting a solvent for the job and suggestions for its safe use. * * *

References—Solvents

National Safety Council: Data Sheets:
Acetone D-Chem. 23.
Benzene, D-308.
Carbon Bisulphide, D-341.
Carbon Tetrachloride, D-331.
Ethyl Alcohol, D-Chem. 48.
Ethyl Ether, D-Chem. 7.
Ethylene Dichloride, D-Chem. 41.
Toluene and Xylene, D-204.
Turpentine, D-Chem. 12.
—How Safe Are Safety Solvents? Safety Reprint Gen. 41.
—What Do You Know About Carbon Tet? Safety Reprint Gen. 58.

National Safety News: An Approach to Solvent Safety; John B. Moore, July 1954.
—Too Many Solvents? R. M. Watrous, M. D., May 1955.
—What Do We Mean by "Safety" Solvents? Emanuel Rosenblat. Apr. 1956.
—Useful and Hazardous; Jan. 1957.
—Is There a Solution to the Solvent Problem? John B. Moore, Nov. 1957.

Heat and Humidity

BOTH climate and manufacturing processes provide complicated and expensive problems for industry. As temperature rises, discomfort increases, productive efficiency drops rapidly, and health may be affected

Accident rates are also influenced by lack of alertness caused by excessive heat and humidity.

Serious year 'round exposures include steel mills, glass plants, foundries, and boiler rooms. Seasonal heat hazards (cold, too) are found in construction work, public utility, highway and railroad maintenance, and farming.

Above 90 degrees, the body rapidly loses its ability to compensate for atmospheric conditions. The effects of heat are intensified by high humidity and lack of air movement.

Some persons, of course, can stand more heat than others but it is good operating practice and good employee relations to keep the working spaces as cool as possible in summer and to shield workers from heat generating processes.

Air conditioned comfort is not yet practical for many industries but other measures will often help. Ventilation comes first. Another method often used with flat-roofed buildings is to keep the roof sprayed with water. For operations where there is radiated heat, shields and insulation may be used.

Ventilation. Keeping air in circulation by general mechanical ventilation is helpful, and spot cooling by fans often increases comfort. However, when the wet bulb temperature of the surrounding air is higher than that of the body, blowing air over the worker makes him feel even more uncomfortable.

In industries such as hot mines, glass plants, and steel mills where heat is excessive, it is frequently useless to blow air over workers unless it is cooled and dehumidified.

HOW TO IMPROVE
YOUR PLANT'S CLEANING AND DEGREASING EFFICIENCY

Join the 4,500 firms which specify
FINE ORGANICS
Safe-Tee® Solvents
Faster, Safer, Economized Cleaning & Degreasing Agents

For Electric Motors, Power Generators, Condensers, Starters, Contact Points, Mechanical and Metal Parts, Bearings, Finely Finished Surfaces, Etc.

All These Advantages!

Fewer man hours . . . reduced maintenance costs.
Equipment down-time at minimum . . . no motor failures due to inefficient cleaning and degreasing.
Low toxicity . . . better health.
High flash point . . . minimizes fire risk.
Harmless to all surfaces, including electrical insulations.
No significant residues after rapid drying. Perfect for prepainting operations and electrical equipment cleaning.

F.O.-128 Added Features!

20 times safer than carbon tetrachloride. More effective!
Excellent penetration and cleaning into slots.
Can be used for cleaning motors in vat, or for spraying windings.
Will not produce dermatitis.

Two Invitations

1. If you have a specific problem, write and tell us about it.
2. Ask for your complimentary copy of "What Do We Mean By Safety Solvents," plus technical characteristics of F. O. Standard SAFE-TEE® SOLVENTS. Address Dept. NS-3.

FINE ORGANICS, Inc.
211 E. 19th St., New York 3, N. Y.
Plants: Lodi, N. J., California, Kansas, Texas
Warehouses In Principal Cities

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Radiated heat. In some operations workroom temperatures cannot be kept below recommended limits. Radiation from hot objects presents difficulties in control. Radiated heat can be decreased by shields or insulation where fans would be ineffective.

Adequate washroom facilities and plenty of cool, pure drinking water also offset the effects of hot surroundings.

Work Clothing. For a hot, humid environment, clothing should be porous, light in weight, and allow air to circulate around the body.

For exposure to local sources of intense heat and infrared and ultraviolet radiation, special protective garments are needed. Leather is widely used, and for more severe exposures, asbestos and wool are used.

Acute Ailments

Exposure to extreme heat, especially when accompanied by physical exertion, may result in heat cramps, heat exhaustion, or heat stroke.

Correct first-aid treatment for each type of ailment is important. All cases should receive prompt medical attention.

In general, the same precautions will help to prevent or minimize all types of disability due to heat.

Heat cramps are due to excessive loss of salt and moisture from the body. They come suddenly and may involve skeletal or intestinal muscles. Even if lost body moisture is replaced by drinking plenty of water, loss of salt may cause heat cramps.

Heat cramps are relieved in a few hours by proper treatment but soreness may persist for several days.

Heat exhaustion is a shock-like state also resulting from loss of salt and moisture. Symptoms are pallor, relatively low temperature, weak pulse, a feeling of restlessness or anxiety, and sometimes unconsciousness. It is much more serious than heat cramps and is occasionally fatal.

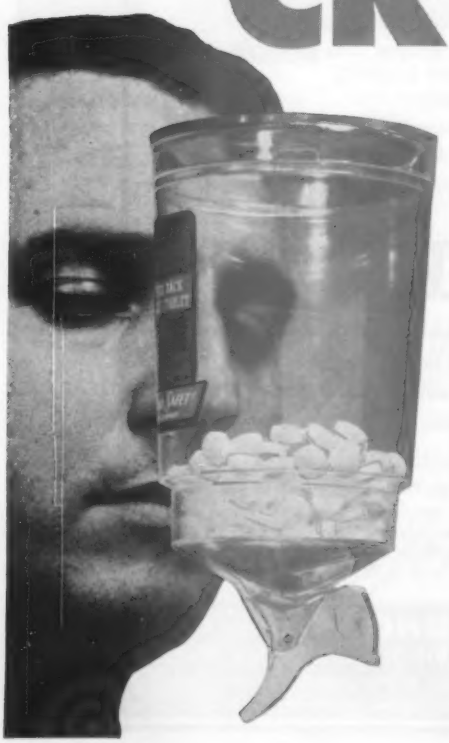
A person with either heat cramps or heat exhaustion should be given salted water, if conscious, and put under medical care as quickly as possible.

Heatstroke (or sunstroke) is caused by exposure to an environment in which the body is unable to cool itself sufficiently—not necessarily exposure to the sun. Body temperature rises and the heat-regulating mechanism breaks down.

Symptoms are severe headache, flushed face, high temperature, visual disturbances, and loss of consciousness. If prompt treatment is available the patient has a good chance of recovery; otherwise death may occur within a few hours. One of the after effects is inability to withstand heat.

Sunburn can be painful and dangerous. In strong sunlight, the head should be covered and ex-

"CRYSTALS"



DISPOSABLE DISPENSERS THAT MAKE IT EASY TO CHECK SALT SUPPLIES

Can you glance at your present dispensers and tell how many salt tablets remain? Or does a maintenance man pry off the tops of dispensers to find out where refills are needed? Or, do dispensers sometimes sit empty because no one reports the situation?

If you have any of these problems—or want to avoid them—write for more information on StaSafe "Crystal" dispensers. When you are equipped with "Crystals", a brisk walk through the plant will tell you precisely what the salt situation is.

Then, to replenish supplies, just remove the empty dispensers—*throw them away*—and slide new dispensers in place. Yes, with "Crystals" all tablets are sealed in at our factory to insure cleanliness. There's never any handling of loose tablets and you are actually dollars ahead by discarding the empties.

"Crystals" come in 500 and 1000 tablet sizes with your choice of enteric coated or impregnated tablets at the same price.

Write today for your booklet showing all StaSafe Salt dispensers.

STANDARD SAFETY EQUIPMENT CO.
232 WEST ONTARIO STREET • CHICAGO 10, ILLINOIS

597 BROADWAY, NEWARK 4, N.J. | 12921 W. WASHINGTON BLVD., LOS ANGELES 66, CALIF. | 855 EAST 152nd STREET, CLEVELAND 10, OHIO

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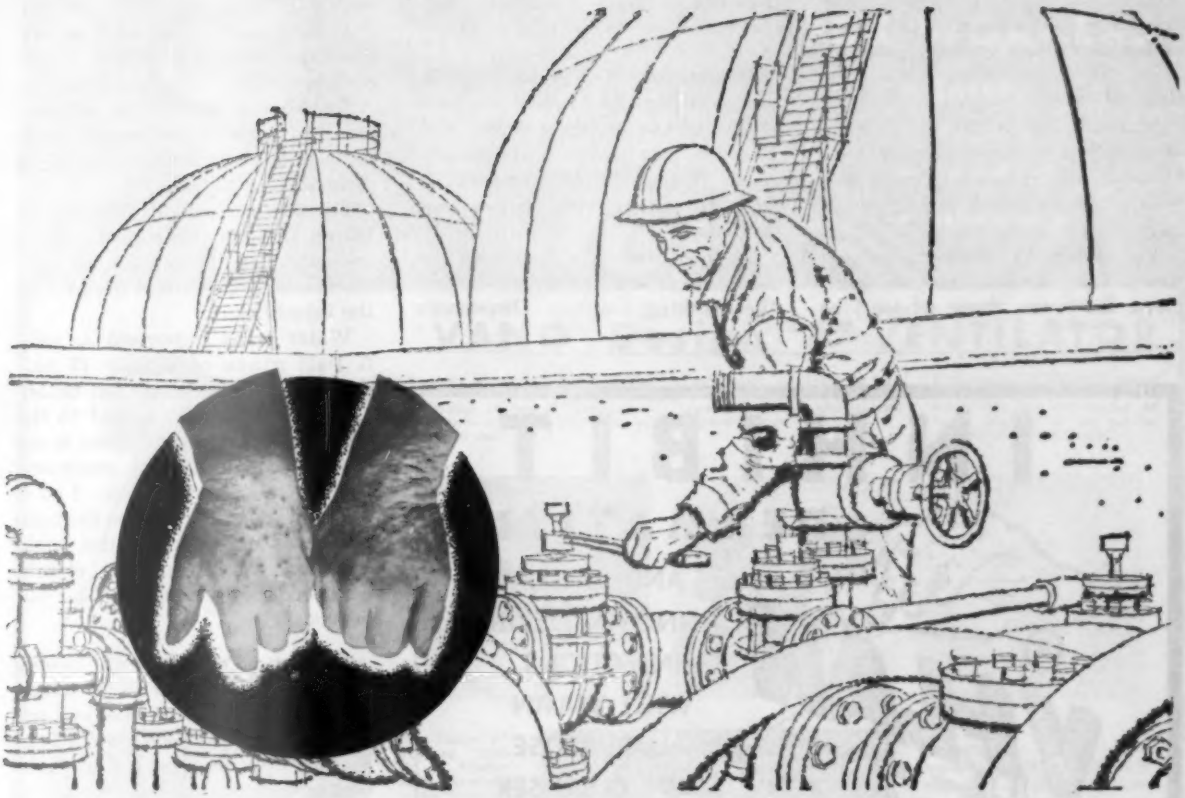


Why DERMATITIS is a needless penalty

Dermatitis caused by industrial materials such as chemicals, oils and abrasives can be prevented. Simply. Inexpensively. With a basic program that safeguards and improves the hygiene of workers — the West Program of Dermatitis Prevention and Control.

How does it work?

No contributing source of dermatitis is overlooked. Specially formulated handcleaners insure personal cleanliness. Antiseptic creams help protect exposed skin areas. "Vinylite" aprons and armguards prevent clothing contamination. Other specialties protect against bacteria infections.

Workers are protected against physical discomfort, lowered morale and lost time.

Management is protected against the costs of medical care, absenteeism, replacement training, sacrificed quality and lost production.

Why not discuss the West Program of Dermatitis Prevention and Control with one of our specialists? His recommendations will help you eliminate the needless penalty of dermatitis. No obligation of course. Just send the coupon.

Programs and Specialties for Protective Sanitation and Preventive Maintenance

WEST CHEMICAL PRODUCTS INC.

WEST DISINFECTING DIVISION

WEST CHEMICAL PRODUCTS INC., 42-16 West Street, Long Island City 1, N. Y.
Branches in principal cities • In Canada: 5621-23 Casgrain Ave., Montreal

☐ Please send your 24 page booklet "The Control of Dermatitis in Industry."
☐ Please have a West representative telephone for an appointment.

Name.....

Position.....

Mail this coupon with your letterhead to Dept. 3

Circle Item No. 42—Reader Service Card

posure of the skin kept at a minimum. Tan should be acquired gradually. Treatment is the same as for any other type of burn.

Use of Salt

Maintaining the salt in the body at an adequate level enables men to work at strenuous occupations where temperatures are unavoidably high.

For sedentary workers, normal use of salt with food may be sufficient. However, those whose jobs require greater physical exertion may not consume enough by this method.

Dispensing. The most convenient and popular method for providing salt is in tablet form. The 10-grain size is more frequently used. It may be obtained either as pure salt or with 30 per cent dextrose.

In most plants, a dispenser for salt tablets will be found beside the drinking fountain. Dispensers are made in several styles and sizes.

Tablets containing dextrose are more palatable and more easily assimilated by many persons.

Diabetics should be warned against tablets containing dextrose and plain tablets should be provided for them.

For those who find difficulty in taking salt, enteric-coated tablets are available. These pass through the stomach intact and dissolve in the intestines.

Water is as important as salt. A full glass of water (8 oz.) should be taken with each tablet.

Salt is sometimes added to the water where drinking water is not used in the industrial processes. Concentrations vary from .1 to .5 per cent, depending upon the temperatures and nature of the work.

Salted drinking water should be used only under medical supervision.

Caution. Persons with kidney or heart disease or high blood pressure should seek medical advice on the use of salt. Such men should not be placed on jobs where they would be exposed to high temperatures or heavy manual work. * * *

INHIBIT DERMATITIS

AND OTHER ANNOYING SKIN INFECTIONS WITH VI-LAN ALL-PURPOSE SKIN CLEANSER

"Keep their hands clean and germ free"

WITH EFFICIENT DISPENSERS

PORTABLE AND STATIONARY THROUGHOUT YOUR PLANT

No. 60-70

No. 50

Recognized throughout industry as a superior, heavy duty paste-cream antiseptic skin cleanser, VI-LAN fortified with Lan Act 12, is properly dispensed with portable and stationary dispensers conveniently placed on work benches, service trucks, oil rigs, laboratories, store rooms, work carts, lavatories, and in EVERY WASH ROOM. Used WITH OR WITHOUT WATER, Vi-Lan removes greases, oils, paints, tars, acids, asphalt, pipe dope, rubber, etc., inhibits dermatitis, and serves to eliminate lost man hours and expensive compensation claims. It drastically reduces hand-cleaning costs, and removes stubborn soils in less time than conventional soaps and detergents. IT DOES WHAT SOAP CAN NOT DO, and its lanolin content preserves natural skin qualities.

Write for descriptive folder

DAMERON enterprises, inc.
427 So. 20th Street
Louisville 3, Kentucky

Circle Item No. 43—Reader Service Card

Drinking Water

WATER constitutes a large part of the human body. Through elimination, perspiration and breathing, this level is continually being depleted. It must be replenished frequently to maintain health, comfort and efficiency. While the intake is necessarily higher in hot weather it is important throughout the year.

Water must be cool and palatable. Facilities should be located conveniently.

Clean, attractive fixtures are also important, particularly for women employees and for the public.

In planning installations these factors should be considered:

1. Number of persons to be served.

COPPUS "BLUE RIBBON" VENTILATORS

identified by the sky-blue band

FOR WORKERS'

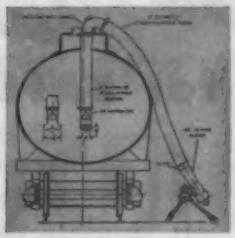
- Safety
- Health
- Comfort
- Efficiency

VANO® Design "A" VENTILATOR

Vano Design "A" cooling interior of furnace, supplying fresh air through 10 feet of "Ventube" to provide safety and comfort during repair work.

Vano Design "A" delivering fresh air to cable manhole, expelling sewer gas, making entrance safe in a few minutes.

Vano Design "A" Ventilator plus a few accessories feeds large air volume into tank car, driving out fumes, stagnant or hot air for workers' safety and comfort.

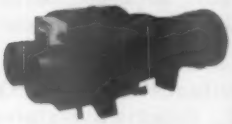


Vano Design "A" supplying fresh air in Reactor Room of Synthetic Rubber Plant.

Vano Design "A" Ventilator supplying fresh air to men working in wing compartments, fuselages, etc.

Powered by a ½hp motor, and equipped with the exclusive Coppus axial-flow propeller-type fan, this general-purpose blower delivers 1500 CFM of fresh air. It supplies ventilation for tanks, tank cars, drums, vats, underground cable manholes, pipe galleries, airplane wing compartments and fuselages, and other confined places. Weighs only 103 lbs. Uses 8"-diameter flexible canvas tubing ("Ventube").

VANO DESIGN "C"



VENTILATOR-EXHAUSTER

Vano Design "C" equipped with 8" discharge tubing removing welding fumes.

Vano Design "C" equipped with two suction lines removing welding fumes for operators' safety.

For withdrawing welding fumes from confined places or directly from the welding rod ...or for expelling fumes or hot air from enclosed vessels. You can get it with 8" suction inlet for 8" non-collapsible tubing ...or with multiple inlet nozzles for 5", 4" or 3" suction hose. The discharge outlet takes 8" "Ventube". Powered by a ½ hp motor, it weighs only 85 lbs.

COPPUS ENGINEERING CORP., 123 PARK AVENUE, WORCESTER 2, MASS.
Please send information on the Blowers that clear the air for Action.

- ☐ in tanks, tank cars, drums, etc.
- ☐ in underground cable manholes.
- ☐ in aeroplane fuselages, wings, etc.
- ☐ on coke ovens.
- ☐ on steam-heated rubber processes.
- ☐ on boiler repair jobs.

COOLING:

- ☐ motors, generators, switchboards.
- ☐ wires and sheets.
- ☐ general man cooling.
- ☐ around cracking stills.
- ☐ exhausting welding fumes.
- ☐ stirring up stagnant air wherever men are working or material is drying.

NAME.....
COMPANY.....
ADDRESS.....
CITY.....

(Write here any special ventilating problem you may have.)

COPPUS "BLUE RIBBON" PRODUCTS—*Designed for Your Industry, Engineered for You*

Circle Item No. 44—Reader Service Card

2. Type of work—light or strenuous.
3. Temperature of surroundings.
4. Purity of water.
5. Temperature of water.
6. Design of fixtures.
7. Location of outlets.

Requirements. One outlet for every 50 persons is a recommended minimum for industrial establishments. More will be needed where temperatures are high or work involves considerable exertion.

It should not be necessary to walk more than 50 ft. for a drink. If outlets are too far apart, employees will not drink enough, or they will spend too much time away from work.

All rooms assigned for eating purposes should have a supply of drinking water. No drinking facilities should be installed in toilet rooms.

Safe water supply. Health departments maintain a close watch over municipal water supplies. But when the plant is located outside the city limits, and for temporary operations such as construction, public utility, and oil-field work, the employer must supervise the water supply. It should be analyzed regularly.

If unapproved or "service" water is used for industrial processes or for fire protection, signs should be posted warning against its use for drinking. Care must be taken to avoid possibility of cross connections between the two systems.

Sterilization. Water of questionable purity can be made safe for drinking by chlorination or boiling. Compounds for sterilizing water, some in convenient tablet form, are available.

Filtration is desirable for removal of sediment but it will not destroy harmful bacteria.

Temperature of water. For workers who perform heavy manual labor, from 50 to 55 F. is recommended. For office workers, restaurant patrons and others who are less active, the temperature may be as low as 45 degrees.

Methods of Dispensing

Approved methods of dispensing drinking water are:
—Paper cups provided at outlet.
—Fountains of approved design.

Paper cups should be kept in dust-proof containers and receptacles provided for used cups. Containers must be kept filled or workers will salvage old cups.

Drinking fountains should conform to specifications of the ***ASA Code Z4.2.*** Important features are:
—An angle jet, which prevents the water falling back on the nozzle.
—A guard to keep the user's lips away from it.

Older installations in factories, offices, stores and public buildings which do not conform to hygienic standards can often be modernized at reasonable cost.

Desirable accessories in drinking fountains are line strainers and pressure regulators. An outlet for filling glasses is also useful, particularly for office use.

LOOK TO... HAWS
for SAFETY
Throughout industry and commerce, HAWS emergency eye-wash and drench shower facilities give immediate first aid for eye, face and body contamination. Skilled design, precision engineering, fine materials... add up to extra safety!
Model 8930 basic eye-wash unit
for SANITARY SERVICE
Drinking facilities to match luxurious or utilitarian surroundings! HAWS fountains and electric water coolers offer top service and sanitation with minimum maintenance cares! Modern service styled in modern materials... assured with HAWS!
Model H-13
Model 1505
HAWS-KRAMER Nyla-Phragm FLUSH VALVE —Critical parts of amazing nylon permit a full 5-year guarantee! A remarkable new item for extended service and sanitation.
Model 7X
SEE THE ENTIRE HAWS LINE in the complete new HAWS Catalog sent free at your request. Write today.
HAWS DRINKING FAUCET COMPANY
1443 FOURTH STREET (Since 1909) BERKELEY 10, CALIFORNIA
Circle Item No. 45—Reader Service Card

BUILT-IN water cooler of stainless steel with fountain nozzle and outlet for filling cups. Compressor is set out of sight below. Twin cup dispensers are built in on either side and twin disposal units built in flush below.

Each cooler may be a unit in itself or a central compressor may serve several outlets.

Hazardous locations. For use where flammable gases, vapors, and dusts may be found, explosion-proof fountains are available.

Maintenance. Regular cleaning of porcelain and metal keeps fixtures attractive and sanitary.

A cuspidor or sand urn should be provided at each fountain to receive discarded chewing gum, cigaret butts, etc.

Salt tablets. A dispenser should be located at each drinking fountain.

Isolated Jobs

Portable containers. For jobs remote from city water mains, such as construction work, public utilities and railroad maintenance, mining, and other isolated working places, there are safe and convenient methods of providing drinking water. It is not necessary to depend on an open bucket with one cup or dipper for the whole crew.

Insulated coolers, with dispensers for paper cups are frequently used. The container should have a tight-fitting cover.

Portable drinking fountains provide another method. Pressure is maintained with a hand pump and slight pressure on a valve releases a jet of warm water at an angle, as in approved permanent installations and a guard keeps the lips away from the nozzle. Insulation keeps the water cool for several hours.

Vacuum bottles for individual use may be provided for remote or hard-to-reach places, such as crane cabs.

Purification. If it is necessary to depend on a local water supply of uncertain purity, the water may be made drinkable by tablets available for this purpose.

Salt tablets. In many isolated jobs men perform strenuous work under the hot sun and perspire freely. Salt tablets may be issued in individual packages. * * *

74% USE ŌNOX®
TO STOP ATHLETE'S FOOT

ŌNOX
Sponge Rubber
Footmat

74 of the 100 Largest Manufacturers use ŌNOX SKIN-TOUGHENER

Modern research has upset old theories about Athlete's Foot control. Skin specialists have proved that the best way to prevent Athlete's Foot is to improve the condition of the skin. *That's what ŌNOX does.* ŌNOX mineral salts toughen the skin and make it resistant to fungus growth.

No splash • No mess • No waste • Odorless
Easy to maintain • Nothing to get out of order
Men like ŌNOX • Relieves tired, aching feet

60 DAY TRIAL OFFER
We will ship your trial order for any amount of ŌNOX and footmats. *You pay nothing* unless fully satisfied after 60 days' use.

ŌNOX, INC.
DEPT. F, 121 SECOND STREET
SAN FRANCISCO 7, CALIF.
• WAREHOUSES •
BROOKLYN • CLEVELAND • NEW ORLEANS
HAWTHORNE, CALIF

Circle Item No. 46—Reader Service Card

Food Service

IN-PLANT FEEDING is firmly established in industry. More than half of the manufacturing plants in the U. S. A. now serve food and that includes practically all of the large and medium-sized establishments.

Service ranges from vending machines dispensing hot coffee, soft drinks, and milk to cafeterias serving complete meals. Table service has become rare in industrial restaurants.

Plants with fewer than 250 employees represent nearly 96 per cent of the country's manufacturing establishments. Vending machines and disposable paper utensils have made it possible for many small concerns to provide food service.

Industry is not in the restaurant business from choice. Many companies set up lunchrooms and cafeterias because nearby restaurants were unable to handle peak crowds during the lunch hour and much time was lost going to and from the job.

Types of Service

There are five main types of food service for industry:

1. Cafeterias preparing and serving hot meals.
2. Canteens or lunchrooms dispensing sandwiches and other packaged foods and hot and cold beverages. A few hot foods may be served.
3. Mobile canteens which circulate through the plant. An objection to this type of service is that it wastes time and disrupts production.
4. Box lunch service.
5. Vending machines.

Vending machines now dispense anything that can be packaged—soup, stew, chili, french fried potatoes, sandwiches, pastry, fresh fruit, and hot and cold beverages.

The increasing popularity of vending machines is due largely to improved design. Modern machines are more efficient in keeping foods hot and compact refrigeration units have been developed to chill foods. Disposable containers and the application of radar for cooking on the spot have also expanded automatic service.

Vending machines are serviced by the companies installing them, relieving the employer of the responsibility of operation.

Few companies expect to make a profit from the service. The usual arrangement is to receive a percentage of the gross receipts which is turned over to employee recreation and benefit funds.

Vending machines, while growing in popularity, are still a supplementary service in many plants. Most of the companies using them also have canteens or cafeterias.

Paper utensils eliminate dishwashing and breakage, and make it possible to operate with a smaller staff. Paper utensils for frozen or for hot foods have simplified food service.

Management. Many companies

SEECLOTH

VISIT US AT BOOTH NO. 3 NEW YORK SHOW

THE SIGHTSAVING METHOD OF CHOICE CLEANS AND FOGPROOFS GOGGLES

WHAT SEECLOTH IS:

SEECLOTH is a chemically treated fabric which when rubbed on glass both cleans and prevents fogging or misting. It has found use in industry as a convenient method for cleaning and preventing the fogging of goggles of workers who must protect their eyes in various industrial operations.

ECONOMICAL:

It is the most convenient and economical method known for this purpose. One piece (8" x 9") will last for a number of months when used on goggles or glasses.

INCREASES WORKER SAFETY:

The fact that the worker has the means for preventing misting of his goggles right on the job increases the safety of the operation since it reduces the temptation to continue to work with misted glasses. He can fogproof them without leaving his work.

HOW TO USE SEECLOTH:

All that is necessary is to wipe the very slightly moistened glasses with the dry SEECLOTH and thus fogproof the glasses for a considerable period.

SEECLOTH has also found use in preventing misting of the inside of windshields in foggy or damp weather. Here also all that is necessary is to rub the very slightly moistened glass surface with the dry SEECLOTH. Mist will then not form on the area that is rubbed. Other applications include its use on spectacles, mirrors, windows, etc.

HOW SEECLOTH IS PACKAGED:

3" x 8" pieces (not individually packaged). Suitable for eyeglasses. 8" x 9" pieces (packaged in 3½" x 6" polyethylene envelopes). Suitable for goggles and masks and fits easily in the pocket of coveralls. 12" x 18" and 16" x 18" pieces (packaged in 5" x 10" polyethylene envelopes). Suitable for automobile windshields, household use, etc.

In addition to the standard sizes, SEECLOTH will be cut to special sizes on order and is also available by the yard—36" wide.

HYGIENE RESEARCH, INC.

684 BROADWAY, NEW YORK, N.Y.

Samples on request. Write Dept. NS 58-3.

Circle Item No. 47—Reader Service Card

have turned cafeteria and canteen operation over to caterers. Others, however, do not like the idea of assigning management of the service to outsiders. If employees do not like the food or the prices, the company, not the caterer, gets the blame. So they provide professionally managed plant cafeterias supervised by the personnel manager.

The contractor gets a guaranteed minimum based on a stipulated per-employee cost of operation. Any operating loss is assumed by the management. The company can decide whether the contractor can make the service self-supporting by serving beans or hash on the plate lunch or giving them roast beef with the employer making up the deficit. Many larger plants follow the latter policy, regarding the deficit as an investment in employee good will.

Smaller companies more often hire an industrial caterer. Foods are prepared in a central kitchen and transported to the plant. This avoids investment in kitchen space and equipment and maintaining the necessary staff. The employer provides the eating space and dishwashing facilities. Dishwashing is kept at a minimum by disposable facilities.

Vacuum insulated containers make it possible to carry hot foods prepared in the central kitchen to lunchrooms some distance away. This equipment is used by some large plants with scattered lunchrooms as well as by caterers.

Sanitation. Wherever food is prepared or eaten, constant vigilance is necessary to maintain clean, sanitary conditions.

Dishes, if possible, should be washed by machines which can use stronger detergents and hotter water than hands can stand.

Facilities for the disposal of garbage, waste paper, bottles, etc., should be provided.

Workers who bring lunches from home and those who patronize box lunch services may eat in locker rooms, if clean and well ventilated, or in work areas where processes would not make it undesirable or dangerous.

Rest periods. The coffee break has become an established institution. Passes of 10 to 15 minutes in the morning and afternoon for coffee, milk, or a soft drink help prevent fatigue. * * *

Washrooms and Lockers

—From page 49

There is less waste with powdered soap than with cake soap.

Liquid soaps are generally satisfactory where a scrubber is not desired. They are frequently used in office washrooms and in first-aid rooms.

With either powdered or liquid soap in suitable dispensers it is easier to keep fixtures clean than with cake soap.

Soap should contain no free alkali and should show a low pH in dilute solution. This can be determined before purchasing.

INDUSTRY'S CHOICE — Coast to Coast
PRACTI-KREME
Skin Protector and Cleaner
PHLO
Waterless Cleaner
PHLO
PRACTI-KREME
. . . This combination skin protector *and* cleaner has been used and proved to check dermatitis *before* it starts — for over 15 years. Applied before work, it provides a flexible, fat-based coating over the skin. When moistened after work, Practi-Kreme cleans completely and quickly.
NEW PHLO WATERLESS CLEANER
. . . Safe, quick and easy to use, Waterless Phlo removes all industrial soils. Containing *both* silicone and lanolin for double protection, it is milky white, smooth in consistency. New handy dispenser makes using and refilling a simple matter. Management and workers agree — coast to coast — there's no better cleaner than Phlo Waterless.
PHLO
. . . is a neutral skin protector rich in lanolin and *now* fortified with silicones. Magic silicones make Phlo water-repellent, adhesive, non-toxic. Phlo is a most effective barrier against bacteria, irritants and soil. Try it . . . then you'll *know* Phlo should be in your plant *now*.
Distributorships available in some areas.
Write for free test samples today.
THE CHEMICAL CORPORATION 54 Waltham Avenue, Springfield 9, Massachusetts
Circle Item No. 48—Reader Service Card

—*From page 49*

Sulfonated oils are useful for dry and soap-sensitive skins. They are frequently used where workers are exposed to the defatting action of petroleum oils and organic solvents.

Synthetic detergents of several types, mild but effective, are particularly useful for removing oil, wax and tar.

Waterless skin cleansers are effective in removing grease and grime and newer types can be tolerated by most skins. The earliest waterless cleanser in general use was kerosene—alone or emulsified with ammonia soaps. Subsequently odorless spirits and alkanolomines were used and now there is a variety of materials for the purpose.

Requirements include: Safety to hands; effectiveness; absence of disagreeable odor; pleasant appearance and after-feel; suitable consistency for dispensing; rapid break when on the hands; and stability to heat, cold, and storage.

Portable dispensers with receptacles for waste towels can be set up quickly. No plumbing connection is needed. Dispensers for paper towels can be attached.

Waterless cleansers are not substitutes for soap and water but they are convenient and efficient for specific uses.

Germicidal cleansers. Ordinary soaps and synthetic detergents remove transient bacteria from the surface but are not effective in reducing those embedded in the skin. Many germicides, such as phenol compounds, have been tested as ingredients of skin cleansers, but required high concentrations that made them unsuitable for daily use.

Hexachlorophene, described by various trade names, has received wide medical approval. It is now used in soaps and detergents for medical, surgical, and deodorant purposes and for general industrial and home use.

TOILET FACILITIES

No. persons	No. toilet bowls
1 to 9	1
10 to 24	2
25 to 49	3
50 to 74	4
75 to 100	5
Over 100	1 for each additional 30 persons

ASA Code Z4.1-1955

Drying the Skin

The community towel lurks in some washrooms in spite of legislation and public opinion. It is the mark of an unprogressive plant.

Paper towels meet sanitary requirements and are economical and convenient. Dispensers should be kept filled and receptacles for used towels provided.

Recessed waste receptacles take one more object off the floor, improving the appearance of the washroom and making cleaning easier.

Mechanical hot air driers are acceptable from the hygienic standpoint. Popular types are foot-operated and may be of the pedestal type or recessed into the wall. Equipment should be well grounded and the electrical connection permanently installed

THE SOLUTION TO AN OLD INDUSTRIAL PROBLEM

Contact Dermatitis

SILCONEX (77% silicone) is the most universal skin ointment now available. It protects not only against water dissolved materials but also against solvents and oil-solvent—water—chemical mixtures. It resists exposure to strong acids and alkalis, oxidizing agents, salts and other chemicals whether in water or organic solution. It prevents initial sensitization by allergens. It is non-conducting and therefore useful in electronic operations. Simple to apply, one or two applications a day provide ample protection. It has an important place as the most universal weapon againt contact dermatitis.

CLEREX & H-R CREAM SOLVENT PROTECTION protect the skin against organic solvents. They wash off with soap and water. CLEREX is a gel which forms a continuous, strong, elastic skin-adherent film which does not interfere with tactile sensation. The film is insoluble in all anhydrous organic solvents, oils and greases. It protects against the hydrocarbons (benzene, benzol, toluene, gasoline, varsal, turpentine, kerosene, solvent naphtha), the chlorinated hydrocarbons, nitriles and the polymerizable monomers (styrene, acrylonitrile, and unsaturated esters for producing polyester resins). Used in making and using paints, varnishes, plastics, polyester resin—fiber-glass compositions. lacquers, inks, and in metal degreasing using trichlorethylene. H-R CREAM is a modification of CLEREX with a vanishing cream base. It is highly resistant to the materials listed under CLEREX. It is useful where protection must be applied to the face and arms as well as the hands. It has proven highly effective against phenolic vapors, creosote, extreme exposure to coolants, tars, rubber-asphalt and rubber-tar mixtures, petroleum oils, plastic and adhesive compositions.

VEREX—a general purpose barrier cream widely used in both the office and the plant, in the mechanical, textile, chemical, rubber and process industries—protecting the skin against ordinary exposure to coolants, dirt, grease, inks, cement, sulphur, rust, carbon black, etc. Protects against contact with poison ivy. Soothing to the skin. Washes off with soap and water.

HYGIENE RESEARCH INC.

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Literature and samples on request. Write Dept. NS58-3

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without extension cords or plugs.

Towel services are used by some establishments, usually stores and offices. For industrial use, individual towels kept in lockers may not be changed often enough and they may come in contact with soiled work clothes.

Toilets

Toilets should be partitioned off from washrooms and lockers. Partitions of enameled metal are attractive in appearance and easy to keep clean. Partitions may be suspended from the ceiling or wall-mounted. Either type makes floor cleaning easier and quicker.

The oval-rim type of toilet with open-front plastic seat is most widely used. Foot-operated flush valves are favored by many.

The flushing mechanism should be rugged since employees often kick the handle instead of operating it by hand. Flush valves should be equipped with vacuum breakers to avoid back siphonage.

Toilets should be not more than 200 ft. from any work place; preferably less than 150 ft.

Facilities for men and women should be plainly marked.

Urinals should be placed throughout the plant in convenient locations to avoid loss of time. One urinal for each 40 men is usually sufficient. Automatic flush valves use more water but are more effective in maintaining cleanliness since many persons seem reluctant to touch hand-operated valves.

Floors of toilet rooms should be of impervious materials, smooth and free from cracks. Tile and concrete are satisfactory. Floor drains permit frequent flushing.

Toilet rooms should have outside windows for light and ventilation if practicable. State or municipal regulations usually contain provisions for ventilation.

Switches for lights, electric driers or other equipment should be located so they cannot be operated by a person in contact with piping or other grounded conductor. Pull chains should contain an insulating link close to the fixture.

Eating lunches in toilet rooms should not be permitted.

Cuspidors or sand urns should be provided where needed and cleaned at least daily. The disposable type requires less handling.

Lockers

A well-equipped locker room is an aid to orderly habits and often to health.

Locker rooms should be fire-resistant, separated by fire walls from the main building.

Exposure to toxic substances calls for extra precautions to prevent poisons being carried away on clothing. Separate lockers prevent contact between street and work clothes. They should preferably be in separate rooms with shower stalls between them.

Supervised washup periods and shower baths are important safe-

SPACE FOR TOILET FACILITIES
(Minimum floor space - sq. ft.)

Closets	16
Lavatories	12
Urinals	12

Powdered Soap

Liquid Soap

EVERY TYPE OF SKIN CLEANSER

Bar Soap

Lightfoot

manufactures all three from raw material to finished product!

A Specialized Soap for Every Type of Plant Requirement!

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To meet every conceivable industrial need . . . for light, heavy or extra heavy duty, for general plant or office use, or to solve specific cleansing problems.

CHOICE OF BAR SOAPS

- A hard milled soap, extremely economical, especially designed for industrial use.
- An extra mild soap for dry or sensitive skins.
- A hexachlorophene product for those departments requiring this type of soap.

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Furnishes profuse lather; will not irritate or dry the skin. Shipped in non-returnable containers.

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Stock warehouses in key cities fill orders immediately upon receipt.

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Lightfoot Advisory Service aids on cleansing problems of all kinds, and has saved substantial sums for many customers.

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Leading industrial doctors advise immediate washing with plenty of running water as the best first aid treatment for any chemical in the eyes. Records prove that washing with water for ten minutes or more, close to the accident, is necessary to reduce or eliminate eye damage.

Forehead operation leaves hands free to open eyelids so water can be directed wherever chemicals might be lodged. Sanitary white baked enamel bowl is resistant to most fumes.

Over 500 industrial plant installations have been made to date.

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Chain Operated
Quick Action
Self-Closing

NEW EMERGENCY SHOWER

The B & A Shower is the quickest and most satisfactory way to saturate a worker with gallons of water the instant an accident occurs, to prevent a disfiguring burn—even a fatality.

Special shower head, no holes to clog—can be used where unfiltered water prevails.

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DISFIGURING FACIAL CUTS AND BURNS!
CUTS AND CHEMICAL BURNS ON ARMS AND BODY!
THIS HAPPENS WHEN UNPROTECTED GLASS BOTTLES ARE BUMPED
NEW LOW COST B & A SAF-T-BAGS
5 PINT
1 GALLON
5 GALLON

are widely used for the safe handling of glass bottles containing harmful chemicals; also the storage and recovery of expensive serums, biologicals, and other costly products.

Painful cuts, disfiguring burns, loss of eyesight, or even a fatality, do result from corrosive liquid splash and flying glass when unprotected bottles shatter.

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BENSON & ASSOCIATES, INC

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guards wherever poisons are handled.

Sloping tops on lockers prevent use for storage. Dust is conspicuous and easier to remove than with flat tops.

Built-in lockers extending to the ceiling avoid dust-catching surfaces.

Lockers should be at least 4 in. off the floor to permit flushing the floor without wetting the contents of the lockers.

Forced ventilation, supplied through perforations in the bottom of the lockers or through louvers in the doors, is helpful in removing odors. If the work is heavy or wet, circulation of heated air through the lockers is desirable.

Oil-soaked clothing, waste, or newspapers kept in lockers may create a serious fire hazard. Lockers should have solid fire-resisting sides and backs, but doors should have louvers for ventilation. Employees should not be permitted to leave clothing or rags saturated with oil or paint in lockers.

Baskets and hangers on elevating chains are used instead of lockers in some industries, such as mines and foundries. Damp work clothing can be dried between shifts and drying can be hastened by steam coils at the ceiling. This arrangement conserves floor space.

Rest Rooms

A rest room should be provided where 10 or more women are employed. Where there are fewer women and a separate room is not available, suitable space may be screened off.

For 10 women, minimum space is 60 sq. ft., with at least 2 sq. ft. for each additional woman employed.

For less than 100 women, at least 1 bed or couch should be provided. For 100 to 200 workers, 2 beds, and 1 bed for each additional 250 workers. * * *

Ventilation

—From page 50

Exhaust hoods should enclose the process as completely as possible or the hood should be located to take advantage of the directional effects of the dust flow.

Dust-removal systems generally require higher air velocities and ducts of heavier gauge metal than those designed for gases.

Control Measures

Where there is a definite source of air contamination, general ventilation alone is seldom sufficient. Control involves three steps:

1. Identifying the substance and locating its source.
2. Atmospheric sampling to determine nature and extent of contamination.
3. Engineering control measures.

Control at the source may involve one or more of these measures:

1. Isolation or enclosure of the hazardous operation.
2. Local exhaust ventilation.
3. Operational changes involving substitution of process or materials.

Isolation confines the operation to a definite location. Exposure of workers is either eliminated or restricted to a few selected, trained, and equipped operators.

Examples of installations which combine exhaust ventilation with isolation and enclosure are: sandblasting rooms, shakeout and tumbling-barrel operations in foundries, dry mixing, and mixing of volatile liquids.

Processes creating excessive heat, humidity, or noise should also be isolated wherever possible.

Local Exhaust Systems

Local exhaust systems are an important means of occupational disease control. Their purpose is to create a sufficient movement of air to withdraw contaminants at point of origin and convey them to a safe point for disposal.

An exhaust system consists of four major parts:

1. Hoods or enclosures near source of contaminant.
2. Piping to connect hoods into system.
3. Collection equipment.
4. Fan.

Each part has its independent function but all must be designed to work together efficiently.

The exhaust hood is the most important part of the system. It should enclose the process as completely as possible. Air velocity decreases approximately with the square of the distance from the hood opening.

Air velocity for effective control varies with the process and material exhausted. Generally speaking, the better the enclosure and design of the hood, the lower the velocity needed.

Hoods or enclosures may be in the form of booths, canopies, lateral hoods, downdrafts through grill openings below the process, or slot-type hoods. The object is to remove the contaminant without drawing it through the breathing zone of the operators and with minimum interference with processing.

Hoods can be made more efficient by addition of flanges.

Ducts connect the hoods to the central fan, distribute the air flow in direct proportion to the requirements of each inlet, and maintain adequate pipe velocity to convey the contaminant to the point of discharge.

The system should be balanced so that each hood draws the proper amount of air. When this condition has been obtained, all means of adjustment should be permanently fixed. Areas of branch pipes and main ducts can be calculated to give correct air velocities throughout the system.

Material used for ducts must resist abrasive action of dust or corrosive effects of gases and vapors.

Sharp turns in ducts should be avoided. They take extra power and cause a large pressure drop.

Traps with clean-out gates should be provided at the bottom of vertical runs, and clean-out gates at regular intervals on the bottom side of horizontal runs.

Fans should have a capacity slightly higher than calculated requirements to allow for leakage in the system, accumulation of material on fan blades, and similar difficulties.

Where the contaminant is hot and has a natural tendency to rise and the operation can be provided with an effective enclosure type hood, natural draft ventilation is often satisfactory.

Portable ventilators are used for supplying fresh air to confined spaces for temporary work. Examples are tanks, tank cars, vats, underground cable manholes, pipe galleries, ship holds, and airplane wing compartments and fuselages.

Where objectionable fumes are produced, as in welding under some conditions, ventilators exhaust contaminated air.

Disposal of Contaminants

Equally as important as collecting the air contaminants is its disposal. Gases, vapors, and mists may often be discharged to the outside atmosphere at a point where they will not recirculate around the premises in harmful concentrations.

Dusts, both harmful and nuisance, require the use of dust collectors in the system.

Recirculation of air from exhaust systems is generally undesirable, particularly when the air has contained gas or fumes. Where only nuisance dusts are involved, recirculation after cleaning is often permissible.

Recirculation is not desirable when handling dusts containing such substances as lead, silica, and asbestos.

Air coming from the cleaning device must fall within the permissible range for toxic or flammable dusts.

Dust Collectors

Methods of removing dust from the air exhausted by the system include:

1. Filtration.
2. Electrostatic precipitation.
3. Wet collectors.
4. Dynamic precipitation.
5. Supersonic flocculation.

Filters are porous mediums through which dust-laden air is drawn. Some are designed to collect dust in the form of a layer on the upstream surface. This is

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characteristic of cloth and paper filters. Thicker types, such as those of metal mesh or glass fiber treated with oil, have greater dust-holding capacity but do not collect the finer particles.

A filter should have:

1. Low initial resistance to air flow.
2. Reasonable length of service.
3. Efficiency under changes of temperature and humidity.
4. Low flammability.
5. Reasonable replacement cost or ease of cleaning.
6. Low maintenance cost.
7. Freedom from odors.

Electrostatic precipitation is highly efficient—particularly for fine dusts which are difficult to remove by other methods. It offers low resistance to air flow. First cost and maintenance cost are relatively high.

Portable units, recently introduced, are helpful in removing dust and smoke from small rooms.

Precipitators are less effective in collecting large particles moving with considerable force. For high concentrations of dust they generally require pre-cleaners. They are valuable when the process requires a practically dust-free atmosphere.

A combination of viscous filter and electrostatic precipitation with a self-cleaning feature is used on some models. It solves the problem of dust capacity and of heavy particles.

Cyclones. A cyclone consists of an outer cylinder fitted with an inverted cone-shaped hopper and an inner concentric cylinder which serves as a discharge duct. Air from the main duct of the exhaust system, under high velocity, enters the large chamber where the air is given a circular motion. The heavier particles are thrown to the outer wall by centrifugal force and fall along the wall. Air escapes through the top.

Cyclones are the most effective for large particles, such as sawdust, shavings, or heavy lint. After passing through them, air cannot be returned to the workroom without further filtering. Cyclones are relatively inefficient for removing small particles.

Multiple small diameter cyclones of small taper collect finer particles than the common large diameter ones, mostly because of higher velocities and greater centrifugal force.

Dynamic separators combine fan and collector in one unit. This type of separator is somewhat like a cyclone, but the centrifugal separating action is performed by the revolving blades. It is more efficient than the cyclone.

In some types water spray is introduced with the dust at the inlet. Wet collection increases efficiency for fine dusts.

Wet collectors use several devices for obtaining contact of water with the exhausted air so that dust particles form a sludge. One type consists of sprays or water curtains through which dust-laden air is drawn. These are efficient collectors for many types of dust.

An important application is in the prevention of dust explosions from grinding aluminum or magnesium.

Supersonic flocculation. Suspended dust is passed through a field of supersonic vibrations, inaudible to the human ear, generated by a high-frequency siren. Vibration flocculates the fine particles, and the aggregates are then collected by cyclones or other measures for collecting relatively coarse particles.

General Measures

Personal protective equipment is needed where exposure is occasional or where complete protection is not practicable. Removal of the hazard at its source should remain the objective.

Sanitation and housekeeping must receive constant attention. Otherwise equipment will lose its effectiveness and unhygienic conditions develop.

Supervision and training of employees, particularly in hazardous operations, are important.

Medical control is an important check on other methods. Main-

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Whirlpool Corp., St. Joseph, Michigan

Halsey Taylor fountains and coolers, such as the models shown, were chosen for Whirlpool's new Administration Building. Manufacturers recognize the fact that the selection of Halsey Taylor equipment provides them with an ever-dependable source of cool water that definitely contributes to maximum productivity.

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The Halsey W. Taylor Co., Warren, Ohio.

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tenance of engineering control is sometimes inadequate and symptoms of absorption of toxic materials by a worker may be the first real warning.

The safety department should be notified of the introduction of new materials and processes so possible hazards may be assessed and safeguards provided.

Workers exposed to toxic substances should have frequent physical examinations. * * *

Housekeeping

—*From page 29*

dries the floor quickly. Scrubbing, rinsing and drying can be done with a minimum of interruption to production.

Floor machines may be pur-

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"KERODEX" protected hands wash clean without scrubbing.

"KERODEX" spreads on like a cream but acts like an invisible glove to shield the skin from the vast majority of industrial irritants such as acids, alkalis, solvents, paints, cutting oils, and resins. "KERODEX" does not smear. It does not affect materials handled, nor is it affected by them. Two types of "KERODEX" are available for "wet" and "dry" work. Write for full information on "KERODEX"® barrier creams to Ayerst Laboratories, 22 East 40th Street, New York 16, N. Y. 5739

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The National Safety Council says that safety messages *which get read* do help to reduce accidents. One of your problems is seeing that they get read.

Here's two-way help for your safety program

AJAX Cups can help . . . because they put their imprinted safety messages right in your worker's hand, several times a day, at just the moment he is relaxed, receptive, most likely to read.

Plus the fact that these crisp, clean AJAX Cups provide the most convenient, comfortable drinking water service, boost employee morale, and reduce the hazard of transmitted infections.

AJAX® CUPS — wedge-shaped, easy to hold, dispense open, ready to drink from; in 4, 6 and 7 oz. sizes, imprinted with assorted stock safety messages at no extra cost—or your own message to order.

AERO® CUPS — for those who prefer a flat-bottom cup; in 3, 4, 5 and 6 oz. sizes. Also with stock safety messages or your own message to order.

Get the full story — ask your paper merchant or write us today for folder giving full details about AJAX and AERO Cups and equipment.

UNITED STATES ENVELOPE COMPANY
General Offices:
Springfield 2, Massachusetts
15 Divisions from Coast to Coast

Circle Item No. 56—Reader Service Card

chased or rented. Some manufacturers have service men who will train plant maintenance crews in cleaning methods.

Power sweepers are time and labor savers where large areas must be swept and the litter is relatively light. Some models are also used for sweeping up leaves and litter from the plant grounds and driveways.

Brooms, brushes, mops, etc. are needed in all plants to supplement mechanized equipment. Tools of good quality are more durable and efficient and they encourage better work.

For dry sweeping, a wide cotton mop or a hair broom may be used. Oily mops may leave a dust-catching film.

Magnetic sweepers pick up ferrous chips, filings, nails, and tacks from factory floors, drives, and walks, where such material might cause fire, explosion or personal injury. This type has a rotary non-electric magnet which is removed from the unit for clearing it of accumulated metal.

A larger power-driven model is used outdoors where large areas must be swept. These remove nuts, bolts, and other ferrous objects around hangars and on runways where they might be sucked into jet engines.

Aisle marking. Wide, clear aisles are signs of a well-kept plant. White lines are constant reminders to keep them free from obstruction and to pile stock within designated areas. Lines can be renewed quickly and economically with an aisle-marking machine.

Plastic film tape in white and colors is also used for marking aisles and storage areas. It is said to be durable and resistant to moisture and most chemicals used in industry. Lines can be changed and damaged parts replaced easily.

White has been adopted for highway traffic lines and is preferred for floor marking within the plant.

Trash containers at convenient locations throughout the plant help to keep litter off the floor. Containers with self-closing lids are best, particularly where oily rags and waste are stored. Containers may be painted a distinctive color to call attention to their presence.

Steam-cleaning units, which deliver jets of steam and cleaning solution under pressure, are used for cleaning some types of processing and fabricating equipment and removing stubborn deposits of dirt from floors, walls, and ceilings.

Both stationary and portable units are available.

Smoking areas are now provided in most plants. Receptacles which will not tip and spill their contents should be provided for cigaret butts and pipe ashes.

Janitors' Supplies

Development of more efficient cleaning materials has kept pace with improvements in mechanical cleaning equipment. Much research has gone into the development of cleaning methods. Manufacturers can furnish helpful data

EMERGENCY SAFETY SHOWERS
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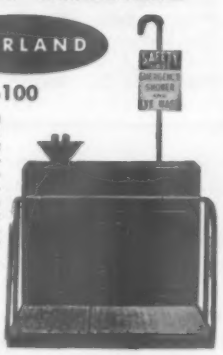
MODEL CO-100
Combination overhead shower and eye bubbler independently activated by aluminum platform treadles. Cabinet houses all piping. Steam or electric heat. Doors front or back.



MODEL SO-101
Safety Shower unit operated by platform grating. Non freezing type. (See inset, opposite.) Overhead light for night identification.

Other Morland Specialties:
Figure "8" Blinds, Temporary Strainers, Retractable Spray Nozzle Assemblies

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on housekeeping and maintenance.

Detergents. Water actually does the cleaning. But water usually needs the aid of a detergent—soap, an alkaline cleaning agent, or one of the newer synthetics. Soap is a detergent, but not all detergents are soaps.

There are three types of dirt: (1) Water soluble matter; (2) Oils and greases; (3) Inert solids.

A cleaner removes dirt by dissolving, emulsifying, or suspending it.

Soap is one of the oldest cleaners and a most useful one. A serious defect is the formation of curds in hard water. Water softeners reduce the amount of soap required with hard water and increase its cleaning efficiency.

Synthetic detergents are derived from sources other than fats. Petroleum and coal-tar derivatives, and by-products of certain industries provide the raw materials. These cleaners are effective when used with hard water.

Alkalis such as washing soda, soluble silicates, and various phosphates form the third class of cleaning materials. Compounds of these are marketed under a variety of trade names. They are useful where sudsy cleaners are

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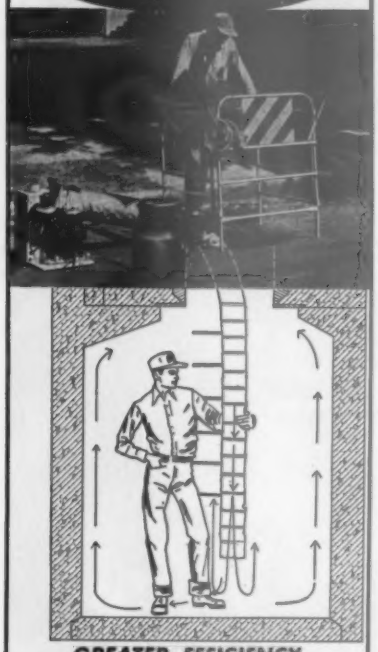

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not desirable. They do not form a slippery film on floors.

Disinfectants and deodorants are useful, particularly for washrooms and garbage cans. They are not substitutes for detergents.

Odors may be indications of unsanitary conditions or merely a nuisance. The source should be removed if possible but a deodorant may be needed.

Hand Protection. Since many cleaning materials are too powerful for safe use on the skin, rubber or plastic gloves are often needed.

Wiping Up Grease

Removing oil and grease from machine tools and dies and other wiping jobs may be done by paper wipers, industrial wiping towels, and waste or salvaged rags.

Either of the first two methods is more likely to promote good housekeeping. Paper wipers are collected and burned at the end of the day, reducing the fire hazard. Convenient receptacles are needed. The paper is highly absorbent and has enough wet strength for use with solvents.

Wiping towels of sturdy cotton cloth are absorbent and offer some protection to the hands where work is done around metal chips and turnings or on rough surfaces. Cloth towels are furnished by industrial laundries.

With salvaged rags and waste, men sometimes keep partly used rags behind benches, in corners and under machines, creating a housekeeping problem and a fire hazard. Safe metal containers should be provided and their use required.

Cleanliness around steam pipes is particularly important. Accumulations of dust, lint, and other finely divided material that might ignite should be prevented.

Controlling Air-Borne Bacteria

Control of air-borne bacteria is required sometimes by manufacturing processes as well as for health reasons.

Ultraviolet radiation and chemical bactericides will destroy bacteria, but practical methods of application impose numerous difficulties.

Ultraviolet radiation, using low-pressure mercury lamps with ultraviolet transmitting glass or quartz envelopes, will destroy many micro-organisms.

Application is by irradiating the upper air stratum of a room, beaming or screening to provide a narrow barrier of protective light, or inserting a radiation source in an air duct.

Radiations of sufficient intensity to kill bacteria are injurious to eyes and skin. Lamps should be used only in fixtures designed for them and should not be in the range of vision.

Chemical bactericides, such as propylene glycol, are effective under most conditions. Effective concentrations are odorless and non-toxic to humans.

Use of chemical bactericides requires close control of humidity in the area to be protected. * * *

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IN SECTION 4:

Noise Control—Engineering and Medical 78

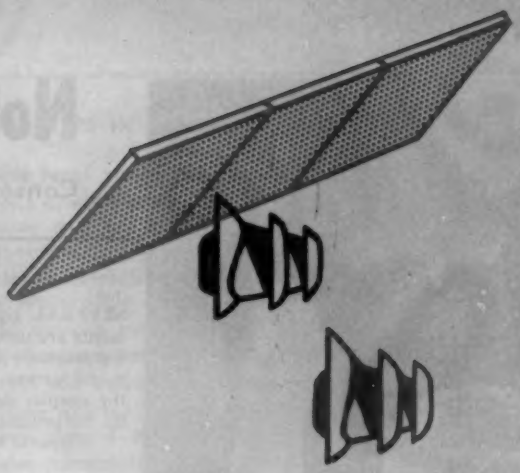
What Type of Noise? 82

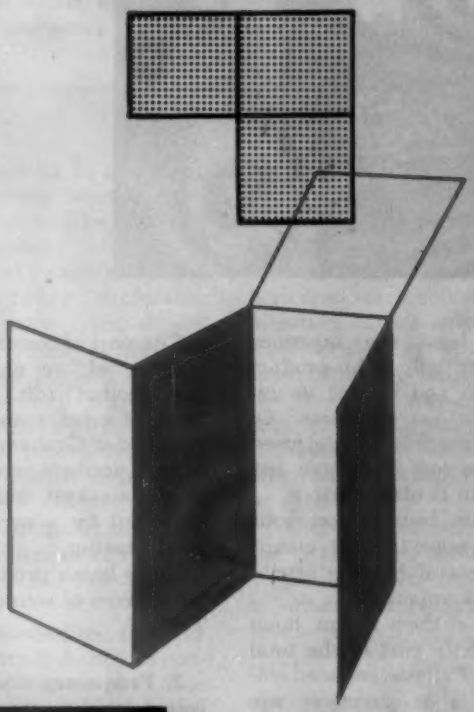
Getting Them to Wear Ear Protection 84

References 84

Selecting a Hearing Aid 86

4





NOISE is an unwelcome camp follower of progress, and one that is difficult to escape in this mechanized age. Ears take much more punishment than they did 50 years ago. The worst offender is the jet plane, though fewer persons are exposed to it than to many noisy manufacturing operations.

Noise is expensive. Claims for compensation have been increasing but compensation payments are only part of the total cost. Increased fatigue and susceptibility to accident are not easy to figure but they are part of the total bill. And noise from nearby industries and from traffic and transportation lower property values.

There are two methods of control—engineering and medical. The first deals primarily with the environment; the second with protection and supervision of the employee. Either or both may be needed.

NOISE CONTROL

SEVERAL types of instruments are used for measuring intensity of sound. The sound survey meter, one of the simpler devices, is useful for preliminary surveys. (General Radio Co.)

Noise Control

Conserving hearing in a noisy world

NOISE—at least the injurious kind—is essentially a by-product of civilization and one of its increasingly serious problems. Of course, it is possible to "get used to it" but the cost in fatigue and nervous strain is often serious.

Industry has become conscious of the cost of noise through claims for impairment of hearing attributed to employment.

Settlement of these claims, however, is not only part of the total cost of noise. Fatigue, reduced efficiency and labor turnover are among the less obvious costs. The effect on public relations may be difficult to measure but nonetheless real.

Noise, as defined by the engineer and the industrial hygienist, means "excessive and unwanted" sound. Its components are:

1. Intensity, or loudness.
2. Frequency, or pitch.
3. Quality, or timbre.

Measurement of Noise

1. Intensity, or loudness, is measured by a sound level meter, commonly called a noise meter. It consists of a microphone, an amplifier, a calibrated attenuator, three frequency response networks controlled by three taps, and an indicating meter.

The unit of sound measurement is the "bel," or more commonly, the "decibel" (db.), which is one-tenth of a bel, named in honor of Alexander Graham Bell. A level of zero decibels represents roughly the weakest sound which can be heard by a person with very good hearing.

Noise levels produced by familiar sources of sound are shown in Table I.

2. Frequency and quality. The sound level meter measures only weighted or unweighted sound pressure. For a more complete description of sound, measurements must involve frequency and quality or timbre.

Different types of noise have different effects on the hearing mechanism. Noise of high intensity is believed to be more injurious to the hearing when it is of high frequency than when the frequency is lower. A locomotive whistle, for example, produces a sound of low frequency, while an air hose produces a sound of high frequency.

Two sounds of identical intensity and pitch may vary appreciably in the annoyance they cause due to differing harmonic make-up or quality.

Information on the distribution of sound pressure as a function of frequency may be obtained through measurements made with a sound level analyzer. Several types of analyzers are available and the choice will depend on the use to which data will be put.

Critical Levels

Limits for injurious noise are still vague and uncertain. The whole problem of noise control requires much more research and evaluation.

In determining critical levels actual intensity of sound is not the only factor. The following are also important:

1. Frequency or pitch of sound.
2. Total length of exposure.
3. Length of exposure period.
4. Whether sound stimuli are continuous or interrupted.
5. Length of interruptions.
6. Type and space of environment, with reference to reverberation.

In addition to these environmental factors, the age of the individual and his record of previous trouble should be considered.

Various plant operations should be tested with an approved sound meter and a record of noise levels compiled by departments. This refers to levels more or less continuously present, not occasional high intensity noise.

TABLE I
Scale of Representative Sounds (Decibels)

Zero Reference	0
Whisper	20
Low Street Noise	40
Conversation	60
Heavy Traffic	80
Critical Level	90
Subway	100
Airplane	120
Jet Engine	140

In the absence of a sound level meter, an approximate idea of the noise intensity may be obtained as follows: Walk through the plant with another person having normal hearing and try to carry on a conversation. If shouting is necessary, the sound level is usually higher than 90 db.

Methods of Control

Methods of noise reduction fall into two classes: (1) Engineering; (2) Medical.

I. Engineering Control

Methods for reducing the noise level may be classified as follows:

1. Control at source. The most fundamental attack on noise hazards is removal at the source. With good engineering design much noise can be eliminated, as is evidenced by comparison for noise of a new surface car or subway car with the older ones. Also, most home appliances have been greatly quieted by improved design.

Much unnecessary noise results from worn and improperly maintained machines. It is important, therefore, that machines be kept in good operating condition.

2. Substitution. Another method of noise control is to substitute a less noisy operation, if possible. Spot, arc, or flame welding may be substituted for riveting in some operations. While application of this method may be limited, nevertheless it should be considered.

3. Isolation. Frequently noise can be isolated so that its disturbing effect will be encountered by fewer people. A noisy machine may be removed from a room containing many people and placed elsewhere so as to expose only the employees necessary for the job. These should be provided with ear protectors.

Well-insulated partitions and tightly-closed doors, preferably of the refrigerator type, should always be provided between a noisy room and adjoining areas.

Another aspect of segregation from noise is reducing time of exposure. Noisy processes should be made as automatic as possible, so that workers can retire to a quieter area at frequent intervals. Quiet surroundings should be provided for lunch and rest periods.

4. Resilient mountings. If heavy machines are firmly bolted to concrete or wood floors, the floor often becomes a huge sounding board. This not only amplifies the original noise volume but helps spread the noise throughout the entire building.

Rubber or other resilient mountings will usually reduce both the vibration and noise. Resilient floor coverings further reduce the noise level.

Many types of vibration insulators are available commercially. Because each machine is a problem in itself, engineering advice should be obtained.

5. Sound-absorptive materials. These are extremely useful for controlling noise in buildings. Hard surfaces, such as plaster and brick walls, reflect sound and cause reverberation. Sounds coming from all directions, as well as those coming from long distances, apparently undiminished, are very annoying.

A remedy is the absorption of high frequency sounds by the application of acoustical materials. This consists of applying sound absorbents to ceilings and walls in the form of acoustical tiles, plasters, sprayed-on compositions, and blankets which have been prefabricated from porous material, such as glass wool.

Where structural treatment is not practicable, acoustical baffles suspended from the ceiling bring a substantial reduction in noise levels.

STEPS IN A NOISE CONTROL PROGRAM

1. **A noise level survey.**
2. **Analysis of each machine and location, determining the source of noise and an accurate decibel count of each machine's noise output.**
3. **Appoint a specialist to study the problem. He should be directly responsible to management.**
4. **Call in outside consultants.**
5. **Check new equipment for quietness in operation.**
6. **Maintain old equipment properly.**
7. **Substitute quieter operations where possible, such as use of welding instead of riveting.**
8. **Consider possibilities of isolation of noisy processes or installation of sound absorbing materials.**
9. **Use ear protective devices where other methods are not practicable.**

TABLE II
Common Industrial Noise Levels
(Range in Decibels)

Spinners, looms, lathes ..	80- 95
Screw machines, punch presses, riveters, cut-off saws	90- 95
Planers, routers, sheet metal, speed hammers.	110-115
Drop hammers, chipping hammers	110-125

AN INSULATED booth to shut out plant noises is essential for audiometric tests. Portable booths are also available. (Lockheed Aircraft Corp.)

COMFORT wins acceptance for ear plugs. Fitting ear protection is one of the nurse's duties at Solar Aircraft Co.

Acoustical treatment does not lessen the direct noise of machines but is highly effective in decreasing indirect or reflected noise.

The problem of sound control by acoustical treatment is far from simple. To get results from the investment the installation should be planned by experts in the field.

6. Protective devices. In some industrial operations the best sound control measures now available still leave the noise level too high for safety. The outstanding example of this situation is in the testing of jet engines.

In such cases operators should be protected with properly designed and fitted ear protectors which will reduce the intensity of the sound reaching the hearing mechanism. The protection which these devices offer for the ears is as necessary as safety goggles for the eyes.

Personal Protection

Four types of devices for ear protection are available commercially:

1. **Molded plugs,** or stopples, are made of neoprene, vinyl plastic, or rubber and inserted in the ear canal. These are easily cleanable and neoprene and vinyl are resistant to ear wax. Plugs should be smooth, with no abrasive action on the external canal. They should be fitted by a trained technician.

2. **Muffs** should fit the head snugly and be free of projections which could catch on machinery and structures. They must clean easily and not cause undue pressure or perspiration at contact points.

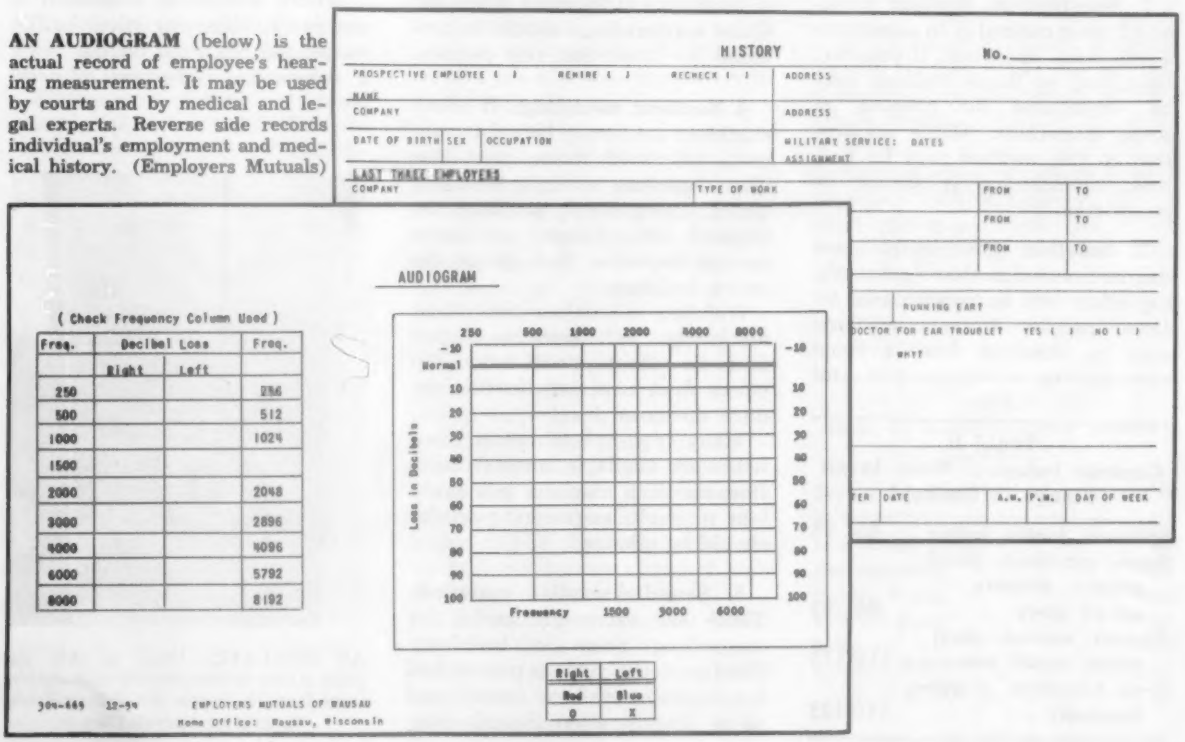
3. **Helmets** reduce sound energy transmitted to the bones of the head. The face should be covered for maximum effectiveness. The firm type of helmet, similar to a football or crash helmet, is rather warm, cumbersome, hard to get on and off. Soft cloth helmets containing muffs are more comfortable and provide adequate protection at moderate noise levels.

Combinations of ear plugs and muffs or helmets give more protection than either alone. They are needed for intimate exposure to jet noise.

4. **Ear valves.** This type of protector is made of non-corrosive metal and neoprene or soft plastic. When placed in the ear canal, the valve admits conversational tones but closes automatically and protects the inner ear from pressure caused by sudden loud noises or concussion from explosions. It is more expensive than the simpler ear plugs.

5. **Waxed cotton plugs.** Balls of wax and cotton are molded by the

AN AUDIOGRAM (below) is the actual record of employee's hearing measurement. It may be used by courts and by medical and legal experts. Reverse side records individual's employment and medical history. (Employers Mutuals)



HISTORY No.

PROSPECTIVE EMPLOYEE ( ) REHIRE ( ) RECHECK ( )

NAME ADDRESS

COMPANY ADDRESS

DATE OF BIRTH | SEX | OCCUPATION | MILITARY SERVICE: DATES | ASSIGNMENT

LAST THREE EMPLOYERS

COMPANY | TYPE OF WORK | FROM | TO

FROM | TO

FROM | TO

RUNNING EAR?

DOCTOR FOR EAR TROUBLE? YES ( ) NO ( )

WHY?

DATE | A.M. | P.M. | DAY OF WEEK

AUDIOGRAM

(Check Frequency Column Used)

Freq.	Decibel Loss		Freq.
	Right	Left	
250			256
500			512
1000			1024
1500			
2000			2048
3000			2896
4000			4096
6000			5792
8000			8192

250 500 1000 2000 4000 8000

-10 Normal 10 20 30 40 50 60 70 80 90 100

Loss in Decibels

Frequency 1500 3000 6000

Right	Left
Red	Blue
O	X

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user to fit his ear canals. This is an effective type of protection for most exposures. These plugs should not be confused with wads of untreated cotton which offer little protection when stuffed in the ears.

The amount of protection provided by good devices varies somewhat with design. Generally it is around 25 to 30 db.

Individual preferences, as well as ears, differ considerably, so it is advisable to have several types on hand and let the user choose the type.

Well-fitted ear plugs provide protection against sound levels up to 130-135 db. under most circumstances, even when exposure is prolonged and continuous.

II. Medical Control

Where processes are noisy, engineering control methods should be supplemented by medical supervision. A record of each employee's hearing should be kept, with periodic tests to detect possible deterioration.

Many companies now measure a new employee's hearing acuity just as they measure his height, weight, vision, blood pressure, etc.

The audiometer is the standard method of testing hearing. This is an instrument which produces tones of the purity and intensity required. One pure tone at a time is presented by headphone to the person under the test. The weakest intensity which he can hear is then found.

The measure of a person's hearing loss of the difference in decibels between the weakest intensity he can hear and the intensity that can just be heard by a person with normal hearing. Another frequency is then selected and the test repeated.

A graph, known as an audiogram, is then plotted. Hearing loss in decibels is plotted on the vertical ordinate against the log frequency on the horizontal ordinate. This gives a quick, accurate picture of the person's hearing acuity in the audible range.

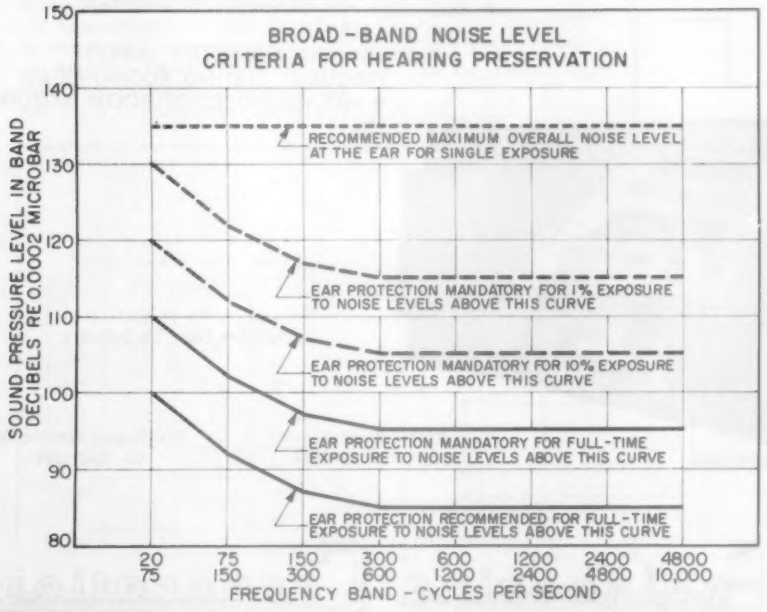
Audiometer tests may be made by trained non-medical personnel. The hearing program, however, should be supervised by a physician.

Routine audiometer tests at regular intervals are advisable in addition to the pre-employment tests.

Audiometric readings will determine the effectiveness of protective devices. The audiogram must be performed prior to initial noise exposure and repeated at intervals determined by the findings and the level of the noise exposure.

Careful pre-employment and periodic audiograms will detect progressive hearing loss and thereby assist in revealing the effectiveness of protective devices. Audiograms will reveal whether ear plugs are being worn, even in more moderate noise level areas. The fact that one can determine this from audiograms puts pressure on employees to comply with plant regulations on wearing plugs. * * *

INSPECTING jet engines requires the utmost in protection. This inspector is wearing both muffs and stopples. (Chance Vought Aircraft)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CRITERIA FOR HEARING PRESERVATION
SOUND PRESSURE LEVEL IN BAND DECIBELS RE 0.0002 MICROBAR
150
140
130
120
110
100
90
80
RECOMMENDED MAXIMUM OVERALL NOISE LEVEL AT THE EAR FOR SINGLE EXPOSURE
EAR PROTECTION MANDATORY FOR 1% EXPOSURE TO NOISE LEVELS ABOVE THIS CURVE
EAR PROTECTION MANDATORY FOR 10% EXPOSURE TO NOISE LEVELS ABOVE THIS CURVE
EAR PROTECTION MANDATORY FOR FULL-TIME EXPOSURE TO NOISE LEVELS ABOVE THIS CURVE
EAR PROTECTION RECOMMENDED FOR FULL-TIME EXPOSURE TO NOISE LEVELS ABOVE THIS CURVE
20 75 150 300 600 1200 2400 4800
75 150 300 600 1200 2400 4800 10,000
FREQUENCY BAND - CYCLES PER SECOND

HOW MUCH noise can the ear take? Above chart shows levels at which ear protection is required for various exposures. (Laymon N. Miller in "Safety Standards," published by U. S. Department of Labor)

What Type of Noise?

Intensity of noise is only one of the elements involved in planning a noise control program. The type of noise is also important:

1. Is it a continuous rumbling of general factory noise? Or are there sharp peaks of loud noise?
2. Is noise continuous? Or intermittent?
3. Are there sudden impacts that cause the noise?

An acoustical engineer can determine the noise level and type of noise in areas that are considered critical. The engineer must determine whether it is feasible to treat the area acoustically,

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SOUND ABSORBENTS reduce or prevent reflection of acoustic energy which strikes them, stopping multiple echoes which can build up a noise level higher than that of the source. (U. S Gypsum Co.)

isolate the process, or treat the machine to decrease noise at its source.

If engineering measures do not solve the problem, personal protection will be needed. Such devices must give attenuation to the point where the sound pressure level does not cause damage. Protection must be for both high and low frequencies.

Types of Exposure

Three common groups of exposure are:

1. Riveting and production (including saws, spindle shapers, etc.). Noise in these areas may be fairly constant, with peaks in the immediate vicinity of the operator. Ear plugs fitted to the individual usually offer adequate protection in these areas.

2. Hammer shops. Noise for a hammer operator is greatest at the time of impact of the hammer, but with a large battery of these machines, the over-all noise level is rather constant. The old-time operator may consider it a badge of his trade to be somewhat hard of hearing and will resist wearing protective devices.

3. Jet engines present the greatest threat to hearing yet devised by man. Aircraft companies conducted considerable research and tested available commercial devices but none offers adequate protection against jet noise at full power. Sound pressure levels around a J57 jet engine, for example, are 130-140 db. at full power. With afterburner attached, levels of 160 db. have been recorded.

Most devices give a fair degree of attenuation for high frequencies. Ear plugs plus helmet-muff provide the best protection now available, yet hearing loss may still occur in some persons exposed to 130-140 db.

Getting Them to Wear Ear Protection

Promoting the use of ear protective devices by employees requires the same type of educational campaign that has secured wide acceptance of goggles and safety shoes. Ear protection is comparatively new and its value must be explained.

A doctor, nurse, or first aid man might discuss ear protection at safety meetings and show the different types available.

Some companies have found that it helps to have a variety of ear protection devices rather than try to push a single type. Men are advised to try the different types on the job and report back to the safety or medical department. If people have a choice the proposition seems more attractive.

Ear protection must be regarded as a long range educational program. It is aided by posters, articles in employee publications and demonstrations at safety meetings. This selling job can usually be done best by a doctor, nurse, or first aid man familiar with ear protection methods.

Some temporary discomfort may be expected at the start but if plugs are too uncomfortable they are not doing the job properly. Individual ear canals differ in size. A small device might fit a person's left ear while a[1] me-

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two great advancements for a more accurate

Industrial Hearing Check Program

BURGESS-MANNING

Sound Room

Now you can obtain accurate, reliable hearing tests that are not affected by extraneous background noises. This quiet test room, efficiently ventilated, can be located in any room or part of a factory. Is completely demountable for easy relocation.

as its companion . . .

Maico presents the Rudmose

Automatic Audiometer

Eliminates Need For Trained Supervisor

Completely automatic, the subject controls his own hearing test while listening to various tones. Needs no supervision after test is started, thereby eliminating need for trained audiologist or extra personnel. Eliminates errors due to operator fatigue, especially late in day. No chance to falsify test by subject. Complete test takes six minutes.

Maico

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YOU CAN RELY ON

Maico

For Your Industrial Needs In Hearing Conservation

American industry, government and the medical profession rely on Maico for precision hearing test equipment. Maico has built more precision hearing test instruments than all other firms combined. If it is a Maico instrument, you can have confidence!

Circle Item No. 64—Reader Service Card

TYPES of ear protectors used at Lockheed Aircraft Corp. These include muffs, stopples, and balls of cotton and wax to be molded by the user.

dium-sized one may be indicated for the right ear. Time spent in trying out different types and sizes will help to win their acceptance. A sense of participation in the program breaks down objections.

Many safety men wear goggles and safety shoes while on the job. It gives them added authority when they urge employees to protect their eyes and feet. Safety men might also experiment with various types of protection for their own ears. Suggestions based on personal experience are always more convincing. * * *

Selecting a Hearing Aid

MANY JOBS can be performed safely and efficiently by persons with impaired hearing. In other occupations, however, even a partially deaf person may be a hazard to himself and his fellow workers. Using the skills of deaf persons is an important rehabilitation measure.

To many persons, hearing aids are of considerable value. Properly fitted, they enable many persons to fill important jobs and live normal lives.

Reliable aids can be obtained at prices as low as $50. Unfortunately there are racketeers in this field as in many others. Some offer fairly good devices at unreasonable prices. Others advertise miracle devices at less than $20—perfect hearing without batteries, tubes, cords or ear buttons. Often these are bait ads to give a salesman a chance to sell an overpriced device.

Medical examination. An examination by an otologist should be the first step. This will show whether or not hearing loss is correctable by a hearing aid, surgery, or other treatment.

If an instrument is advised, the patient has two choices. He may visit dealers and try various instruments, or he may visit a clinic.

These clinics are maintained in some cities at colleges, hospitals, and societies for the hard of hearing. Services as a rule are nonmedical. They include an audiometric test to determine hearing loss, selection of a hearing aid, and training in its use. Some also offer lip reading, speech correction, and guidance in personal and employment problems.

Most clinics do not sell hearing aids but have several types from which a selection can be made. This is important since no one brand will be satisfactory for all types of hearing loss.

Choice of an instrument may be influenced by these factors:

1. *Service.* Does the manufacturer have a representative in the customer's community or in a nearby city?

2. *Cost and convenience.* Standard models may vary in price from $50 to $200. Cost of batteries may be important.

Transistor types are compact and economical to operate.

If the dealer does not give an audiometric test, the otologist's report should be presented. If a test is given by the dealer, it should be compared with the otologist's report. Although there is a difference in audiometers, the curve of the test results should be approximately the same.

When trying instruments, these factors should be considered:

1. Improved hearing for speech is the objective.
2. Speech must not be made uncomfortably loud.
3. The wearer should hear comfortably, without tickling or pain.
4. The instrument should have a reserve of power. If speech is barely audible with the volume control turned to the loudest point, the instrument is inadequate.
5. Differences between comparable models of various manufacturers are usually less than the sales talk would indicate.

Ear inserts. Important in an air-conduction instrument is the ear insert molded to fit the ear. The mold, made of plastic, is usually included in the price of the instrument.

Proper fit of the ear insert is important. One that fits too loosely will cause a distracting squeal. One that is too tight will be uncomfortable.

Binaural hearing. A person who has normal hearing in one ear and little or none in the other

Zenith's Crusade for Better Hearing gives you...

HEARING'S GREATEST HELP

Zenith's aim . . . to "Bring the best possible hearing to the greatest possible number of people". . . is succeeding.

World's largest selling hearing aid, Zenith now enjoys the satisfaction of seeing the Zenith policy of rigid adherence to highest standards of Quality . . . the Zenith policy of producing a unit to meet every type of correctible hearing loss . . . and the Zenith policy of sensible prices . . . all helping physicians and rehabilitation experts to better serve the hard-of-hearing.

Your greatest help in the work of helping those who suffer hearing loss is the certainty with which you can recommend any Zenith Model and any Zenith Hearing Aid dealer.

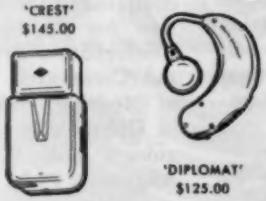
Only Zenith gives you all these assurances: Nine 4- or 5-transistor models • Sensible prices; from $50 to $175 • Ten-Day Money-Back Guarantee • One-Year Warranty, proof of Quality • Five-Year After-Purchase Protection Plan.

Zenith leadership is yours to command. Zenith's continuous educational program has developed a trained, competent dealer organization that is properly equipped to demonstrate and adjust Zenith Hearing Aids for your employees. Your nearby dealer is listed in the Yellow Pages or send coupon at right.

*Lenses and professional services in connection with the eyeglass frame available only through an ophthalmologist, optometrist, or optician.

ZENITH®
The Royalty of Hearing Aids

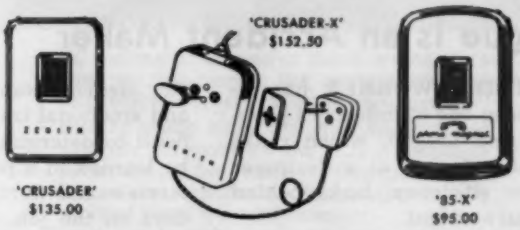
'VOGUE' & 'EXECUTIVE'*
$175.00



'CREST'
$145.00

'DIPLOMAT'
$125.00

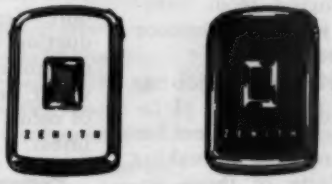
'REGENT'
$165.00



'CRUSADER'
$135.00

'CRUSADER-X'
$152.50

'85-X'
$95.00



'50-X'
$65.00

'50-R'
$50.00

FREE . . . one year's subscription to *Better Hearing*, the interesting national magazine exclusively for the hard-of-hearing. Also includes descriptive literature and local dealer list.

Zenith Radio Corporation, Hearing Aid Division,
5801 Dickens Avenue, Dept. 93P, Chicago 39, Illinois

NAME _____

ADDRESS _____

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Circle Item No. 65—Reader Service Card

has little difficulty understanding speech in a quiet room. In compensation cases, loss of hearing in one ear is usually rated at only 10 per cent disabling.

The person with one good ear, however, may have difficulty in determining the source and distance of sound. There is also decreased ability to understand speech when there is other noise in the room, or when many persons are talking.

Advantages of binaural hearing are: Localization, discriminative selection, speech sound discrimination, ease of listening, sound identification, and improvement in sound quality.

"Hearing glasses" enable the wearer to hear through both ears. Hearing aid circuits are contained inconspicuously in the temples of spectacles. Each temple contains three transistors, a mercury cell battery (smaller in diameter than a dime), printed circuit, microphone, and other parts. Each side has separate volume controls.

Performance should not be judged on a hearing aid's performance in a sound-conditioned salesroom. It should also be tested where there is background noise. The buyer should receive a written statement that it can be returned in 10 days for full refund if not satisfactory.

Learning to use a hearing aid is easy for some persons; for others it requires patience and persistence. The wearer must learn to accept and interpret both pleasant and unpleasant sounds, just as persons with normal hearing must do.

Users who are most satisfied with their aids are those who wear them all day, every day, seldom varying the volume control.

Helpful information has been compiled in the *Manual of Operation for an Industrial Hearing Conservation Program*, issued by the Committee on Conservation of Hearing, American Academy of Ophthalmology and Otolaryngology, 1136 W. Sixth St., Los Angeles. * * *

the LIGHTER SIDE
WHAT HAPPENED TO MY OTHER WRENCH?
AW, MOM, DON'T GIVE ME THAT KISS IT AND MAKE IT WELL STUFF... I WANT FIRST AID LIKE POP GETS!
SEE WHO'S KNOCKING - THE BELL MUST BE OUT OF ORDER AGAIN!

Fatigue Is an Accident Maker

THE TIRED WORKER has always been one of industry's problems. And fatigue, which ranks with absenteeism as a destroyer of plant efficiency, lurks behind many an accident.

Fatigue may result from countless causes, ranging from overexertion on the job to late sessions at poker or watching TV.

Physical exertion on the job has been declining as a cause of fatigue. Labor-saving equipment has eliminated many back-breaking jobs. Yet in spite of these improvements the worker still gets tired. Such fatigue may be caused by physical, psychological, and environmental conditions, not all of which are connected with the job. There is still much to be learned about these.

Here are some of the occupational factors:

Placement. Work assignments should match the physical and mental abilities of the individual. Physical capacity can be determined by pre-placement and periodic medical examination. Mental and emotional traits are more difficult to determine but much can be learned in a pre-placement interview and during the first few days on the job.

Environment. These are important: Ventilation, illumination, reduction of waste motion, control of noise, washrooms, drinking water, food service, scientific use of color, general order, and cleanliness.

Personal problems. The supervisor should attempt to prevent causes of friction among employees and between himself and employees. Workers should feel that their jobs are important. Employee counseling is often helpful.

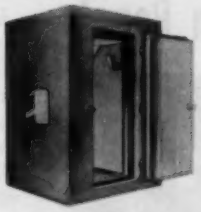
Hours of work. Overtime is often a necessary evil, even though many employees welcome the chance to earn extra money. When carried on over too long a period the net result is a reduction in overall efficiency and increased fatigue. During the war many industries found that accidents increased as the work extended beyond eight hours a day and six days a week. When production schedules call for overtime, extra precautions should be taken. Food service and medical facilities should not be neglected on the night shift.

Rest periods. For monotonous and repetitive work a five-minute rest period in each working hour

your hearing conservation program begins in an IAC audiometric examination room

IAC
Your Standard of Silence

SERIES 400-CT



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IAC Audiometric Examination Rooms are America's finest and most complete line, constructed to meet your requirements with guaranteed performance!

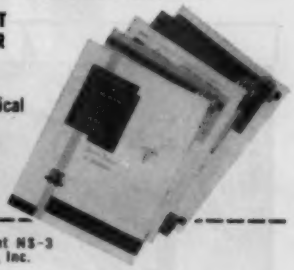
Used by leading institutions, otolaryngologists and otologists, IAC Rooms will give years of dependable service and constant results. Prefabricated for economy and ease of construction, the rooms can be easily relocated should it become necessary.

IAC Examination & Research Rooms are now in use in hundreds of installations for:

- Industrial Audiometry
- Hearing Aid Fitting
- Psychophysical Testing
- Otological Research
- Clinical Examination
- Bone Conduction Testing
- Psychogalvanometry
- Electrophysiological Testing
- Research in Heart Sounds and Auscultation

SEND TODAY FOR THE MOST COMPREHENSIVE DATA EVER ASSEMBLED ON AUDIOMETRIC ROOMS!

. . . includes complete technical data — specifications — performance data — plus "A Guide to the Purchase of Audiometric Rooms!"



Medical Equipment Department
INDUSTRIAL ACOUSTICS COMPANY, inc.
341 Jackson Avenue • New York 54, N.Y.
CYpress 2-0180

Medical Equipment Department NS-3
Industrial Acoustics Company, Inc.
341 Jackson Avenue
New York 54, N. Y.

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☐ Have Representative call.

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Company _____
Address _____
City _____ Zone _____ State _____

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is desirable. For less intensive work, a rest period of 10 to 15 minutes in the middle of the first and the last half of each shift is recommended. At these breaks, snacks and coffee, milk, or soft drinks help to restore energy. The coffee break, it seems, has become an established institution.

Rotation of shifts. When plants operate multiple shifts, an attempt is usually made to give all employees a break by rotating them on day and night shifts. Some companies feel that shifts should be rotated every two or three months rather than every week or two, since the shorter period does not give the individual enough time to become adapted to the changed hours.

Health education. Through educational programs employees can learn the essentials of personal hygiene, nutrition, posture, recreation, and relaxation.

Distributing Equipment

—*From page 3*

established. Equipment should be selected on the basis of design, performance, reliability of manufacturer, etc.

It is desirable to standardize items throughout the plant insofar as possible. It is likewise good policy to review the list periodically, modifying it when new and improved equipment becomes available.

Adequate supplies of various items, in a well-assorted range of sizes, should be kept in stock. A competently supervised marker system is usually the most feasible for assuring adequate supplies.

It is also disastrous to issue equipment that is ill-fitting. It will be uncomfortable and offer reduced protection.

Who Pays?

Most companies issue personal protective equipment without cost to the employees. This is only natural, since if the company cannot provide a completely safe working environment, it should provide the necessary means for the employee to protect his life and health.

For certain equipment some companies pay only a portion of the cost. Notable examples are safety shoes and prescription safety glasses. This category generally includes equipment which is of a supplemental nature and is supplied as a service to the workers.

Experience has shown that employees tend to take better care of property in which they, as well as the company, have a financial interest.

Low-cost items used in considerable quantities can be most conveniently issued at the various manufacturing areas. More expensive or specialized equipment should be stocked and issued at a central point, so that a minimum working stock can be maintained. Authorization for its withdrawal should come from the worker's immediate supervisor, since he is in a position to maintain a watch over consumption and prevent needless waste.

The stock room should be neat, clean, orderly, and presentable. Its appearance will have a marked effect on the employees' acceptance of equipment. No one likes to think of wearing respirators that have been stored in a room where poor housekeeping is conspicuous. This factor is particularly important in the case of new employees, who often get their first impression of a plant when they are sent to the stores for equipment.

From a morale standpoint, it is desirable to clean, sterilize, and repair dirty or worn-out equipment as needed, and always before use by another person. Some plants have an employee who moves throughout the operating areas—cleaning, sterilizing, and adjusting safety devices, such as goggles, respirators, etc.

Other items could more conveniently be cleaned and reworked at a central point where spare parts are available. Manufacturers can usually furnish instructions for repairing and cleaning personal protective equipment.

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This is it! MAKE QUIET AREAS AT LOW COST with E. H. Noise Reduction Panels

Here is a real contribution to industry's need for low cost, soundproof and sound absorptive noise barriers. Can be cut in the field to any size and shape! Complete with erection members, soundproof doors and bucks. Write today for complete literature to Dept. 10-M.

ELOF HANSSON, INC.
Acoustical Division
711 Third Avenue, New York 17, N. Y.

E. H. Panels are 4 x 8' for easy building.

Enclose noisy machinery

Circle Item No. 68—Reader Service Card

CUT DOWN NOISE
WITH THE S M R
EARSTOPPER

Soft, comfortable, resilient, the SMR EAR STOPPER adjusts itself to all shapes, turns and movements of the ear canal. Tends to anchor itself in the ear. Has a long life and is reasonable in cost. Furnished in a plastic case. Forty-five cents per set in gross lots.

Free sample when requested on company stationery.

SURGICAL MECHANICAL RESEARCH INC
1985 Beverly Blvd., L.A. 57, Calif.
SMR

IN SECTION 5:

Eye Conservation 92

Respiratory Protection 96

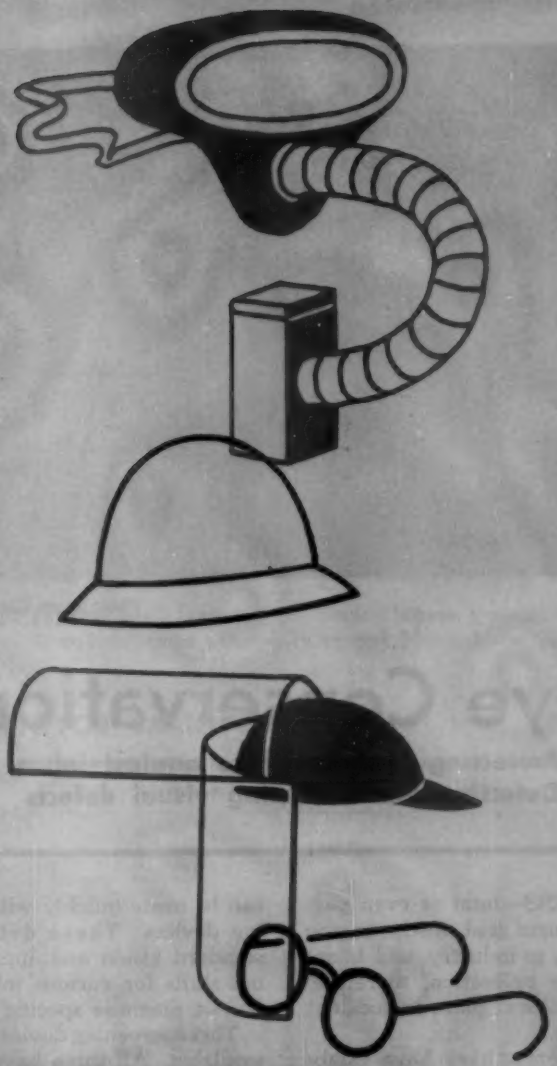
Head Protection 114

PERSONAL PROTECTIVE EQUIPMENT is a second line of defense against injury but many operations would be impossible without it.

Removal of all hazards at the source is not yet possible. In many of these exposures are brief. And there are many emergencies where this equipment permits rescue or repair work and prevents heavy loss of life or property.

Goggles, face shields, and hard hats have saved many a worker from crippling, sometimes fatal, injuries. Stories of injuries prevented are appearing constantly in employee publications. Less spectacular, but none the less important, is the record of respiratory equipment in protecting man against air contaminants.

Because of its size and scope, this section on Personal Protection has been divided into two parts. Part I deals with protection for the eyes, head, and respiratory organs, the phases of the subject covered by Handbook 24 of the National Bureau of Standards.



5

PERSONAL PROTECTION PART I

Photo from Carbide Californian, Carbide and Carbon Chemicals Corp.

Eye Conservation

- **Protecting eyes and face against injury**
- **Detecting and correcting visual defects**

BLINDNESS—total or even partial—is tragic and costly to the individual, to industry, and to society. Eye protection, therefore, has a prominent place in accident prevention.

Some companies have established 100 per cent eye protection—goggles or face shields for all employees, and for visitors, too. Others require eye protection only on certain jobs.

Some companies have been so successful in promoting eye protection that many employees wouldn't drive a nail at home without goggles. This is often encouraged by lending equipment. The item is charged against the employee and credited when returned.

Eye tests are important in preemployment examinations. They are an aid to safe placement and enable the employee to have unsuspected defects corrected.

Evaluating Eyesight

The visual status of each applicant should be determined on employment.

Mass examination of employees can be made quickly with screening devices. These detect substandard vision and appraise visual skills for various jobs. They do not diagnose specific defects.

Three screening devices are now available. All three have been in use for years and have proved satisfactory. Two may be purchased while the third can be obtained only on lease.

Scoring cards are provided with the instruments and service includes instruction in testing and evaluating results.

The tests take five minutes or less and may be given by trained laymen. Employees needing correction are referred to ophthalmologists or optometrists.

Types of Protection

For protecting eyes and face against various occupational hazards, four general types of equipment are used:

1. Goggles (safety glasses)
2. Face shields
3. Welding masks and helmets
4. Acid hoods

For a detailed list and descriptions of various items of equipment for eye, head, and respiratory protection, see definitions from *National Bureau of Standards Handbook H24, page 96.*

Corrective Lenses

For visual defects, the wearer may have the correction ground in heat-treated lenses, or cover goggles may be worn over spectacles.

For optical reasons as well as convenience, corrective lenses are preferred. Most prescriptions can be ground in impact-resisting glass and in the improved plastics. Safety glasses of course, are heavier than ordinary spectacles.

In prescribing corrective lenses for goggles or for ordinary spectacles, the refractionist should be familiar with the job. It is particularly important to know the distance of the work level from the eye.

Bi-focals, or even tri-focals, may be required for some individuals.

Cover goggles are often preferred where the correction is complicated and expensive lenses would be subject to pitting on the job. They also have advantages where a nearsighted person requires deep minus lenses. These might be excessively thick at the edges yet too thin for adequate protection at the center.

Cover goggles are available in the cup type with heat-treated

glass lenses and the wide-vision type with plastic lenses.

Types of Goggles

Safety glasses are available in many types for practically every occupation. The protective medium may be heat-treated glass, transparent plastic, wire screen, or light-filtering glass.

Heat-treated lenses in spectacle frames, or cup goggles offer basic protection. The nature of the job and its eye hazards determine the specifications.

Spectacle goggles are worn for light or moderately heavy work, such as grinding, machine work and assembling where working positions are not too close.

The frame must be rigid enough to hold the lenses in position in front of the eyes. The nose bridge should be adjustable, or goggles should be available in enough sizes to fit various faces.

Side shields of metal or plastic provide protection against light objects flying from the side. They should be used where operations are close together, or where employees work together on the same operation.

Cup goggles are used for heavy grinding, machining, chipping, riveting, work with molten metals, and similar operations.

The cup should be wide enough to protect the eye socket and distribute the impact from any blow over a wide area. The cup should be flameproof, corrosion-resisting, and non-irritating to the skin.

Mask-type goggles, with frames of soft vinyl or rubber, offer protection against splashes of corrosive chemicals and exposure to fine dust. This type is obtainable with lenses of heat-treated or untreated glass or acid-resistant plastic. Some types may be worn over spectacles. Ventilated types are less troubled by fogging.

Dust goggles, leather mask type, for non-corrosive dusts, are made with heat-treated, untreated or filter lenses. Wire screen ventilators around the eye cup provide air circulation.

Miners' goggles of corrosion-resisting wire screen are used for work underground and in other locations where fogging is a serious problem. The screen is coated a dull black to reduce reflection.

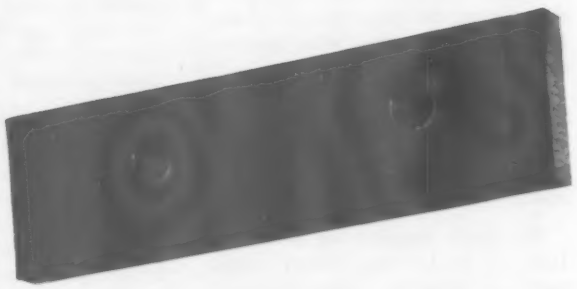
Plastic lenses, greatly improved in recent years, have qualities of

EYE PROTECTION FOR VARIOUS JOBS

TYPES OF EXPOSURE (National Bureau of Standards Handbook H24)	TYPES OF PROTECTION									
	CUP GOGGLES	SPECTACLES	—WITH SIDE SHIELDS	PLASTIC EYE SHIELD	PLASTIC FACE SHIELD	WIRE SCREEN SHIELD	FILTER LENSES	RUBBER OR VINYL GOGGLES	HOODS	WELDING HELMETS
Heavy impact, large particles—Chipping, calking, some riveting operations, sledging in quarries.	•		•							
Moderate impact, dust and small flying particles—Sculing and grinding metals, stone dressing where quartz is not involved, some woodworking operations.		•	•	•	•					
Metal sparks and spatter — Electric spot and butt welding; no exposure to excessive energy or glare.			•	•	•					
Splashing metal — Babbitting, pouring lead joints for pipes, casting hot metal, dipping in hot metal baths.	•			•	•	•				
Splashing liquids — Acids and caustics, dipping in galvanized tanks, some japanning operations.	•				•			•	•	
Reflected light and glare — Long exposure to light reflected from snow, water, roads, etc.; incidental glare from furnaces, working near acetylene welding, etc.	•	•	•				•			
Injurious radiant energy—Moderate reduction in visible radiant energy—Oxyacetylene welding and cutting.	•						•			
Injurious radiant energy — Large reduction of visible radiant energy—Arc welding.										•

Can you tell a killer

Read the true story in these aluminum bars of how well safety hats protect you from lethal overhead blows. These actual plates were used in recent laboratory *field type* tests of all safety hats available. Can you recognize the marks of killing blows? The deeper the depression . . . the lower the safety margin. See how Bullard outperforms all others . . . in fact, gives you 33% better protection . . . when compared in *field type* tests!



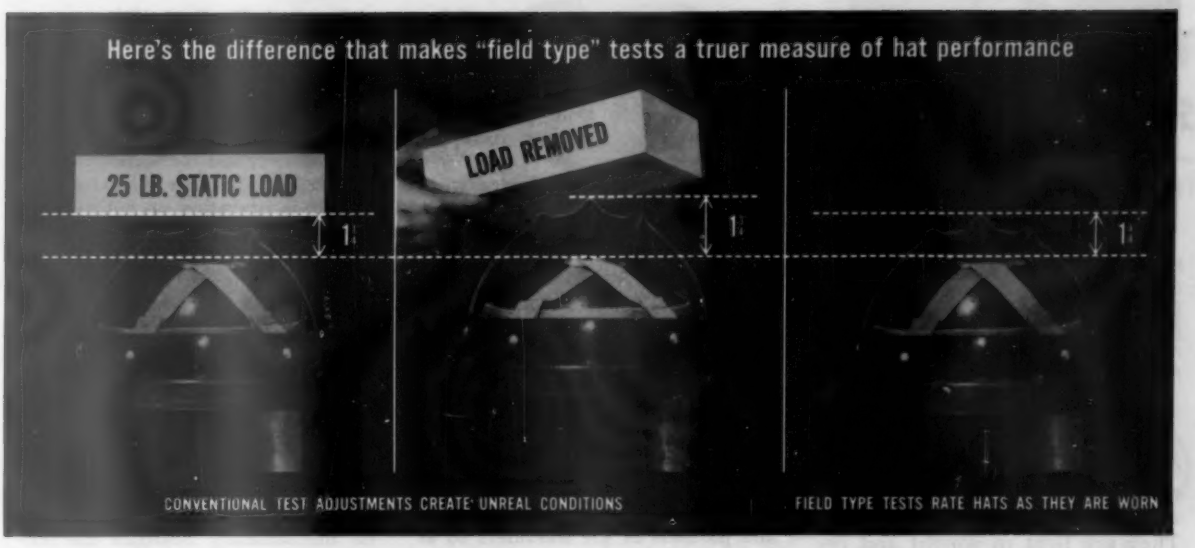
ONLY ONE TRUE MEASURE OF SAFETY HAT PERFORMANCE—"FIELD TYPE TESTS"

For years manufacturers have been content to test hats under the artificial laboratory conditions. Bullard engineers conducting these tests have gone one step further. They have removed the one condition in the standard specifications that makes conventional test results exaggerated and unrealistic!

Bullard fiber glass

Bullard aluminum

by his tracks?

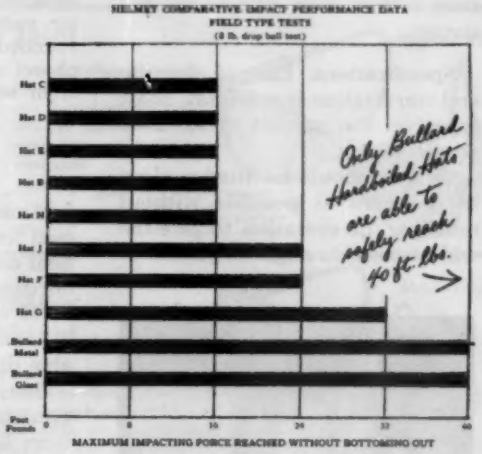

Here's the difference that makes "field type" tests a truer measure of hat performance
25 LB. STATIC LOAD
LOAD REMOVED
1¼"
1¼"
1¼"
CONVENTIONAL TEST ADJUSTMENTS CREATE UNREAL CONDITIONS
FIELD TYPE TESTS RATE HATS AS THEY ARE WORN

Standard specifications for adjusting crown clearance—distance between top of inside shell and top of test block—make current testing methods unrealistic. Crown clearance measurement in these tests is made with a 25 lb. static load on top of the hat. Of course, when the static load is removed, the shell of the hat pops up, giving crown clearance of as much as 1¾". You know that men in the field do not wear hats this high . . . they are uncomfortable and may be blown or knocked off too easily . . . they wear them low—close to their heads.

In the tests reported field conditions are more closely approximated. Hats have been adjusted to a 1¼" crown clearance without the use of a static load. When the advantage of this extra crown clearance is taken away, see what a different picture you get of safety hat performance . . .

BULLARD
INDUSTRIAL SAFETY EQUIPMENT
HARD BOILED ®

E. D. BULLARD COMPANY
Sausalito, California
WRITE FOR SUMMARIZED TEST REPORTS #B1-R6



Bullard Safety Hats and Caps are available in fiber glass or aluminum in a wide choice of colors.

Circle Item No. 69—Reader Service Card

SIGHT-SCREENING devices are used for visual surveys. Information obtained from these tests shows individual's fitness for various jobs and reveals weaknesses needing correction. These instruments can be used by trained laymen. (Panhandle Eastern Pipe Line Co.)

optical glass in light transmission and freedom from distortion. Corrections may be ground in them. They are light in weight and resist fogging. They are useful for spotwelding, as molten metal does not adhere to plastic as readily as to glass.

Plastic withstands considerable impact but is marred or scratched more easily than glass.

Plastic lenses should be cleaned with liquid cleaners and soft tissues rather than silicone-treated tissues.

Specifications. Ease of cleaning and sterilization is essential. Most types on the market meet these requirements.

Goggles should be fitted as close to the eyes as possible without touching the eyelashes to give the widest possible angle of vision.

PLASTIC face shield with coating said to reflect 95 per cent of infrared rays (Vacuum Equipment Div., New York Air Brake Co.)

Devices for Eye, Head, and Respiratory Protection

Definitions from National Bureau of Standards Handbook H24*

Protector. A device placed in front of or over the eyes, face or head to afford protection from the hazards in industrial processes or from the natural elements.

Goggles. An optical device worn in front of the eyes, whose predominant function is protection to the eyes only.

Face Mask. A device worn before the eyes and a portion or all of the face, whose predominant function is protection to the eyes and face.

Helmet. A rigid device worn by the operator which shields the eyes, face and neck, and a portion or all of the other parts of the head and is held in place by suitable means.

Hood. A non-rigid device which completely covers the head, neck and portions of the shoulders so as to exclude dust and flying particles.

Shield. A device held in the hand, or supported without the aid of the operator, whose function is protection to the eyes and face.

Gas Mask. A device worn on the face, and so arranged that the inhaled air is drawn entirely through a canister which cleans it chemically.

Supplied-Air Respirator. A device designed to supply the wearer with air suitable to breathe while surrounded by a contaminated atmosphere, and to prevent the latter from being inhaled.

Hose Mask. A supplied-air respirator having a tight-fitting facepiece to which is attached a hose through which air may be forced by a blower, and through which the wearer can inhale whether the blower is operating or not.

Air-Line Respirator. An air-line respirator is a supplied-air respirator designed to be connected by a hose to a supply of fresh air under positive pressure sufficient to maintain a continuous flow into the facepiece.

Filter Respirator. A device designed for the wearer to inhale the surrounding atmosphere after it has passed through a filtering medium to remove the impurities. The filtering medium may chemically absorb or mechanically obstruct the impurities.

Cartridge-Type Respirator. A filter respirator whose filtering equipment is carried in one or more cartridges mounted on the facepiece. Such a respirator may be a mechanical filter respirator, a chemical filter respirator, or a combination of both.

*NBS Handbook H24 (ASA Safety Code for Protection of Heads, Eyes, and Respiratory Organs), out of print for several years, is reported to be in the final stages of revision under procedure of the American Standards Association.

Minimum permissible size for oval lenses is 44.5 mm. in the vertical dimension and 48 mm. in the horizontal. Round lenses should be 50 mm. in diameter.

Lenses should have no appreciable distortion or prism effect.

Strength of heat-treated lenses (resistance to impact) should conform to specifications of the Federal Standard Stock Catalog, the government's official purchasing guide, Specification GGG-G-G-501B.

Sweatbands, worn across the forehead in hot, humid locations, help prevent fogging of goggles and spectacles.

Non-fogging compounds, applied to the lenses, help to keep the glass clear.

Face Shields

Face shields of transparent plastic give eye and face protection on such jobs as metal-sawing, working with chemicals, buffing, sanding, light grinding, or bottle manufacturing.

They should not be used for welding, heavy grinding, or where resistance to severe impact is necessary. Shields may be worn over spectacles.

Wire mesh shields are used for pouring low-melting-point metals, as in babbitting. The mesh stops splashes of metal and allows better ventilation than a solid shield.

—To page 116

SAFETY GOGGLES | SAFETY SPECTACLES

FORM FITTING COMFORTABLE

WATCHEMOKET eye SAVERS

LIGHTWEIGHT EASY TO WEAR

Model 440SV Methacrylate Lens
Model 441SV Acetate Lens

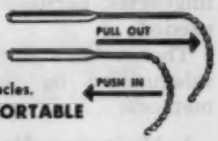
Soft Vinyl Frame

"Stac-Vent" — a new principle in goggle ventilation.
Clearer Vision . . . More Comfort . . . Greater Safety.
Large frame fits comfortably over all prescription glasses.
Lenses optically correct — shatterproof — easily replaced.
Also available with regular or screen ventilation.

Model 415

Tuc-Away

Shatterproof, optically correct lenses.
Easily replaced . . . snap-in, snap-out.
In clear, light, medium or dark green.
One size and model fits every worker.
Wearer adjusts and maintains his own spectacles.
WORN BECAUSE THEY ARE COMFORTABLE



Model 442

Soft Vinyl Frame 50 mm Round Hardened Safety Glass Lenses

Maximum protection where there is extreme abrasion.
Maximum comfort and minimum weight.
Large size, fits over all prescription glasses.

Visor-Tuc

New Over-Eyes Protection

Almost 100% protection, plus all the comfort of "Tuc-Away", "Visor-Tuc" fits snugly against the forehead.
Shatterproof Eye Savers lenses interchangeable in Tuc-Away Model.

Model 422

Model 492

Welding Goggle Opaque Black Soft Vinyl Frame

Furnished with replaceable 50 mm round, Federal Specification, filter lens shades 3, 4, 5 or 6, protected inside and out by cover lenses.

Split Joint

Split Joint Frame makes changing lenses a simple operation, no heating to distort frame. Retrax temple easily adjusted — One size Standard 47 mm drop eye lenses. Removable clip-on side shields available.

Quick, easy replacement of:
PLASTIC SAFETY LENSES
PRESCRIPTION LENSES
PLANO SAFETY GLASS LENSES

Model 80

Model 99

Cheepee One-Piece Goggles

Close fitting, lightweight, comfortable.
Optically correct . . . no distortion.
Available in clear or medium green.

Methaspec Eye Shield

Optically correct, one piece, curved Methacrylate Eye Savers Lens provides heavy impact protection.
Lens is .080" thick, available in clear or light, medium and dark green.

Model 55

For details, see your Authorized Eye Savers Supplier or write direct

Quality Eye Protective Equipment ***Made by the Leaders in Plastics***

WATCHEMOKET OPTICAL CO., INC.

232 West Exchange St., Providence 3, R. I. • In Canada: Levitt-Safety Limited, Toronto 10, Montreal 26, Winnipeg

Circle Item No. 70—Reader Service Card

Respiratory Protection

AIR CONTAMINANTS range from relatively harmless "nuisance" substances to toxic dusts, vapors, mists and gases. Respiratory equipment is designed to protect the worker against inhalation of all of these.

Removal of contaminants at the source and enclosure of processes reduce concentrations in the workroom air, but leaks and breakdowns may occur, and there are operations where exposure is brief or infrequent. For such contingencies, personal protection is needed.

The worker's air intake may be safeguarded by three principal methods:

1. Mechanical filters to remove dust and mists.
2. Absorption or chemical reaction to remove gases and vapors.
3. Supplied air.

Types. Five general types of respiratory equipment are:

1. Canister gas masks.
2. Chemical cartridge respirators.
3. Filter respirators.
4. Supplied air equipment (hose masks and air-line respirators).
5. Self-contained apparatus supplying oxygen or air.

HOSE MASK, with air normally supplied by a blower, is used in atmospheres immediately hazardous to life.

Each type of equipment has a definite field of usefulness, as well as limitations. Manufacturers and dealers therefore want to know the type of exposure when equipment is ordered.

Approval. Equipment which meets accepted standards carries the label of the Bureau of Mines. Approval specifies type of exposure as well as design and construction.

Gas Masks

A gas mask consists of a face piece connected by a flexible tube to a canister. Inhaled air is drawn through the canister which cleans it chemically. No one chemical yet discovered will remove all contaminants, so the canister must be chosen for the exposure.

The nearest approach to complete protection is the universal mask for protection against combinations of acid gases, organic vapors, ammonia, carbon monoxide, and smokes. It should be remembered, however, that as the number of gases increases, the service time of the canister decreases.

Canister gas masks with full facepiece are for emergency protection in atmospheres immediately dangerous to life. Their effectiveness is limited to concentrations of two per cent by volume, except for ammonia, for which the limit is three per cent.

Characteristics. Types of gas masks, their identifying colors and uses are:

White—Acid gases, such as hydrogen sulfide, sulfur dioxide, chlorine, hydrocyanic acid.

Black—Organic vapors, such as aniline, benzene, ether, gasoline, carbon tetrachloride, chloropicrin.,

Green—Ammonia gas.

Blue—Carbon monoxide.

Yellow—Combination acid gas and organic vapor.

Brown—Combination acid gas, organic vapor and ammonia gas.

Red—Universal—All industrial gases, including carbon monoxide, smoke, and fumes.

White with green stripe—Hydrogen cyanide.

White with yellow stripe—Chlorine.

FILTER RESPIRATOR is used for protection against dusts, mists and fumes.

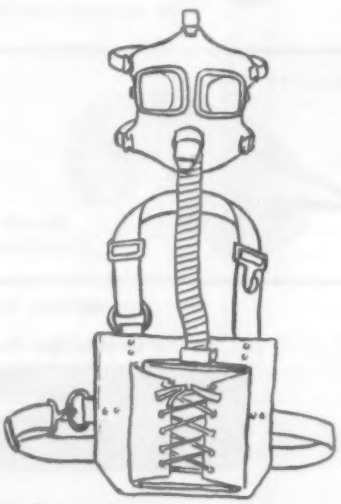
Cartridge Respirators

Chemical cartridge respirators usually have a half-mask face connected directly to a small container. Chemicals are similar to those used in gas masks.

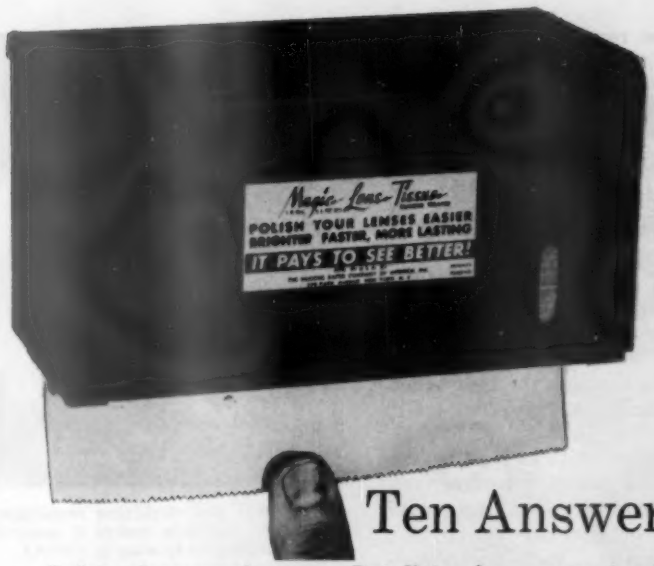
Cartridge respirators are approved only for non-emergency situations—for atmospheres which are harmful only after prolonged or repeated exposures.

Filter Respirators

Protection against any form of particulate matter can be provided by a mechanical filter respira-



CANISTER GAS MASK is used where toxic gases make atmosphere unsafe.



Why Buy Magic*?

*TRADE MARK REGISTERED U.S. PATENT OFFICE

Ten Answers To That Question

Safety glasses make sense. But dirty glasses are a terrible hazard. One large industrial company found 68% of employees frequently injured had poor vision. Obviously, safety eyewear must be cleaned with something. And that something should be MAGIC SILICONE LENS TISSUE because:

1. It is the largest and strongest on the market. It cleans and polishes instantly without tearing. A marvel of the papermakers art. Yet it costs only $8.40 per carton of 6 big refills, and the dispenser is only $2.50, or free when exchanged for any other cleaning stations.

2. MAGIC is loaded with silicone sparkle-power. Yet it does not have the glossy surface which prevents absorbing oil and oil mists from lens. This means only one MAGIC tissue is used to clean and polish. Substantial saving.

3. Another exclusive feature: It's interfolded. Thus only one sheet at a time is removed from the dispenser. Average consumption is only six refills (one carton) per year.

4. And in grimy areas like coal mines or flour mills, where washing with a fluid is unavoidable, or anti-fogging treatment required, install the HEAVY-DUTY Cleaning Station; or in plants using plastic eyewear. MAGIC Cleaning & Anti-Fogging Fluid is combined in one can, *pressure packed*. Touch the top and Presto! the can does the rest. Scientifically regulated.

5. Each can cleans about 360 pairs of glasses, whereas old-fashioned 6 oz. bottles clean only about 100 pairs. Using MAGIC FLUID costs as little as 6 cents a month per employee. You would be amazed if you figured your old-fashioned costs.

6. It's durable: Companies now using our Fluid report it prevents fogging 6 to 8 hours.

7. If competitive liquid is being used, such liquid generally sells for about $8.45 a gallon. One carton of MAGIC cans provides about the same number of cleanings as two gallons of any liquid. MAGIC FLUID costs $12.50 per carton. A saving of $4.40 over two gallons of ordinary liquid.

8. Each packet of MAGIC HEAVY-DUTY WIPERS (not silicone-treated) contains more sheets per packet than competitive paper, yet costs less. 18 big 760 sheet refills per carton at only $11.60. Dispenser only $5.95. No scratching, no lint. Compare this cost – and buy!

9. For those wishing to make their own fluid in bulk: Our adapter to the HEAVY-DUTY Dispenser, with giant 16 oz. bottle and plunger complete, is available ($2.70). This large bottle requires as little as one refill a day. Again an important saving in maintenance.

10. Any type of dispenesr may be exchanged free for MAGIC.

MAGIC Pop-Up Pack in self dispensing box for your desk or any place in the office, plant or laboratory, $11.95 per carton of twelve Boxes.

Magic
T.M. REG. U.S. PAT. OFF.
Cleaning Stations

THE SILICONE PAPER CO. OF AMERICA, INC.
75 East 45th St., New York 17, N. Y.
SERVING EVERY MAJOR INDUSTRY IN AMERICA

Circle Item No. 71—Reader Service Card

tor. Major items to be considered are resistance to breathing offered by the filter element, adaptation of facepiece to faces of various shapes, and fineness of particles to be filtered out.

ASA Code Z-2 requires that the complete respirator show a resistance not in excess of 50 mm of water at an inhalation rate of 85 liters of air per minute. Resistance to exhalation under the same conditions may not exceed 25 mm. Commercial respirators are usually held to considerably lower resistances.

Mechanical filter respirators are not effective against solvent vapors, injurious gases, or oxygen deficiency.

Types of mechanical filters approved by the Bureau of Mines are:

1. **Pneumoconiosis-producing and nuisance dust respirators,** for such dusts as aluminum, cellulose, cement, coal, charcoal, coke, flour, gypsum, iron ore, limestone, and wood.
2. **Toxic dust respirators,** for protection against toxic dusts that are not significantly more toxic than lead, such as arsenic, cadmium, chromium, lead, manganese, selenium, vanadium, and their compounds.
3. **Mist respirators,** for protection against pneumoconiosis-producing, chromic acid, and nuisance mists.
4. **Fume respirators,** for protection against fumes (solid dispersoids or particulate matter) formed by condensation of vapors, as from heated metals or other substances.

Supplied Air

Hose masks. Atmospheres immediately hazardous to life require air supply from a point beyond the contaminated area. With a hose mask, air is normally supplied by a blower. The wearer can inhale through the hose when the blower is not operating.

Hose lines (with at least a 1-in. connection) are recommended rather than *air lines* connected to a compressed air system for most operations. In a case of failure of air supply, it is possible to breathe through a considerable length of hose.

Hose masks are not approved with more than 150 ft. of hose or where inhalation resistance exceeds 2.5 in. of water, or the exhalation resistance exceeds 1 in. of water.

Attachments of additional hose should not exceed the total prescribed length. It should be approved for use with that type of mask and should have approved couplings. The blower should be located so that only fresh, clean air is supplied to face masks.

CLEANING and sterilizing respiratory equipment regularly makes it easier to get employees to wear it. (MSA)

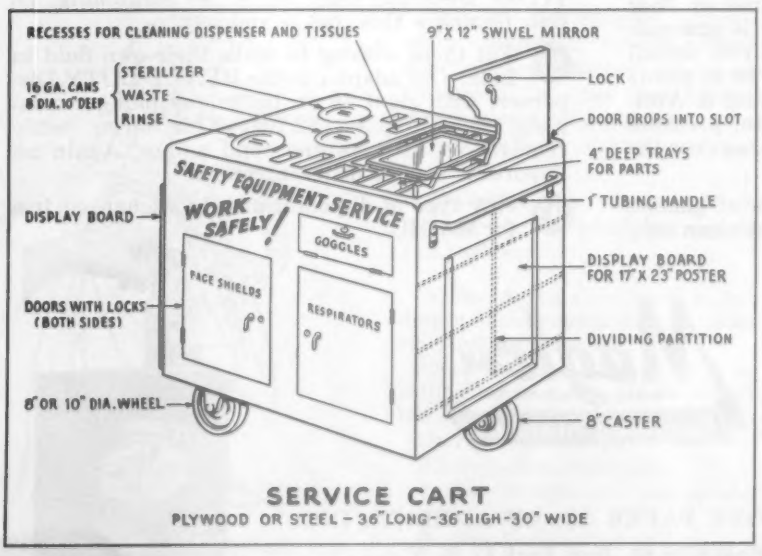
The hose mask should always be used for work which involves entering tanks or pits where there is a dangerous or unknown concentration of dust, mist, vapor, or gas, or oxygen deficiency.

Harness to pull the hose lines should be inspected before use. Component parts of harness must be able to withstand a pull of at least 250 lbs.

Air-Line Respirators

Air-line respirators, connected to compressed air-lines, provide essentially the same protection as hose masks. They are not intended

—To page 106



MOBILE service cart equipped for cleaning, sterilizing, and adjusting goggles, face shields, and respirators. The cart tours the plant servicing equipment on the job.

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National Safety Council: Accident Prevention Manual for Industrial Operations, 1955.
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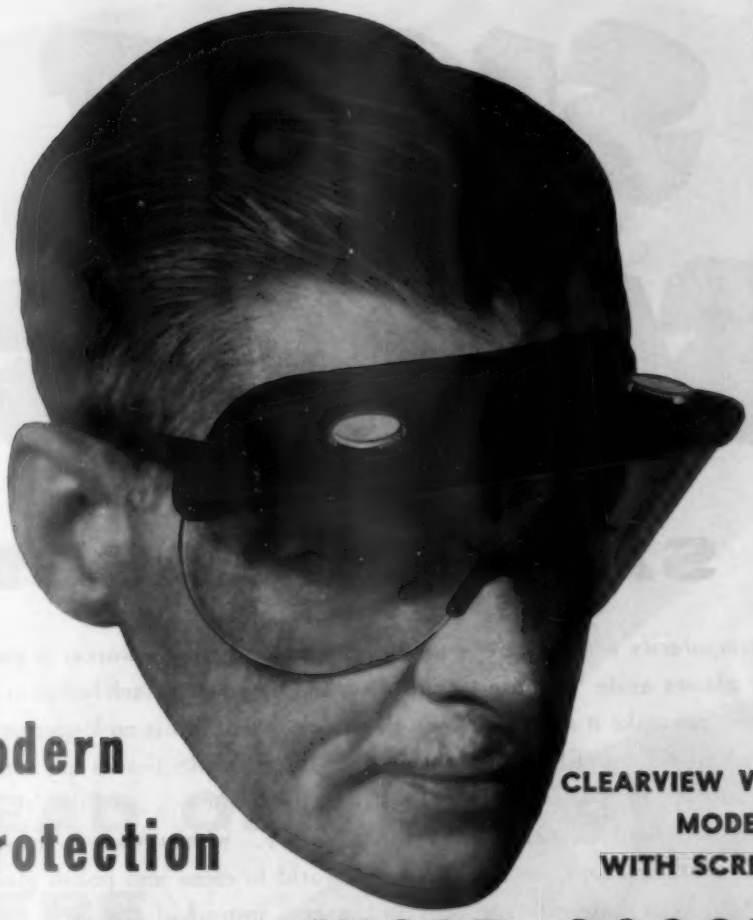


get modern eye protection

CLEARVIEW VISOR GOGGLE
MODEL No. 1
WITH SCREENED PORTS

WITH JONES FULL VISION VISOR GOGGLES

WITH ALL THESE EXCLUSIVE FEATURES . . .

- VISOR TOP STOPS GLARE from overhead light
- 100% VISIBILITY for greater safety and comfort
- FITS over LARGE frame GLASSES
- NO STRUTS or frame to obstruct vision
- NEW VISOR head band suspension for added comfort
- REPLACEABLE one-piece lens
- NEW down-angle lens
- INCREASED impact strength
- NO FOGGING—no pitting
- NO GLARE, distortion or reflection
- NEAT — smart — modern appearance
- SAFELY NON-FLAMMABLE
- LIGHT WEIGHT—cool comfortable
- ECONOMICAL to use
- ULTRA VIOLET ABSORBING LENSES

SEND FOR ILLUSTRATED CATALOGUE FOR MODELS LISTED BELOW:

ASSURED WORKER ACCEPTABILITY

CLEARVIEW #1	Clear Lens
GLARESTOPPER #1A	Light Pale Green
GLARESTOPPER #2	Pale Green
GLARESTOPPER #2A	Grey-Sun Goggle
GLARESTOPPER #3	Dark Sage Green

ELIMINATE EYESTRAIN AND REDUCE FATIGUE

Choice of 18 hole or Screened Port ventilation

ONE-PIECE SHATTERPROOF PLASTIC LENS
(METHYL-METHACRYLATE)

CALL YOUR JOBBER OR WRITE TO:

JONES & COMPANY • 861 BROAD ST. • PROVIDENCE 7, RHODE ISLAND

Circle Item No. 72—Reader Service Card

SIGHT SAVERS

KEEP SAFETY GLASSES . . .

You are *temporarily without an eye safety program* every time a worker in your plant lays his safety glasses aside "because they're dirty and it's just too much bother to clean them." But now you can make it *so easy* to keep glasses clean that this is no longer an excuse. Just put popular SIGHT SAVERS close at hand. SIGHT SAVERS tissues are treated on both sides with just the right amount of silicones to do the job best . . . and they're just the right size (3″ x 7″) to do it most efficiently, economically . . . without waste. Already preferred by millions as the quickest, easiest way in the world to clean and polish glasses, SIGHT SAVERS help keep those safety glasses on the eyes instead of the shelf, to make your eye safety program *complete!*

FREE WALL DISPENSER
for your SIGHT SAVERS Tissues

- Compact (3½″ x 8″), easy-to-install cleaning stations are FREE with your purchase, of SIGHT SAVERS.
- Hold packet of 800 tissues — can be refilled before empty.
- Dispense only one tissue at a time — no waste — no mess — no maintenance — permanently lubricated.
- Available in white, black, safety green.

Circle Item No. 73—Reader Service Card

HERE

INSTEAD OF

HERE

Order
SIGHT SAVERS
and FREE
Cleaning Stations
from your safety
supply distributor.*

first in
silicones

Dow Corning CORPORATION
MIDLAND, MICHIGAN

* In Canada from any branch of The Safety Supply Company.

CESCO

the Complete Line that's years ahead in safety, style, and comfort!

Plastic and Metal Frame Glasses

These new open-type safety glasses give your workers all the features they want most . . . smart styling plus on-the-job utility. Long-wearing plastic and metal frame makes them an economical safety equipment choice because lenses can be replaced separately. All-in-one plastic section does double duty as lens rim and Comfort Bridge pad. Provides full closure at nose section and is unaffected by skin oils and cleaning agents.

In 2 Sizes • 46 x 39mm (No. 326)
48 x 41mm (No. 328)

Shape of Lens • F-7 in clear and anti-glare safety glass and clear Cescolite plastic

4 Bridge Sizes • 20, 22, 24 and 26 mm

Plastic and Metal Frame Glasses with Side Shields

The **No. 336** plastic and metal frame glasses offer the same outstanding features as the glasses described above plus wire mesh side shields. Available in 2 sizes: 46 x 39mm and 48 x 41mm.

CESCO FOR SAFETY

CHICAGO EYE SHIELD COMPANY

Circle Item No. 74—Reader Service Card

CESCO Safety Glasses and Goggles give Workers Greater Protection... give You Greater Production!

FULL PLASTIC FRAME SAFETY GLASSES

You'll have no trouble winning worker acceptance of these popular plastic frame glasses, especially among women workers! Their shape, style and colored plastic frames all combine to give them the appearance of attractive personal glasses. You can choose from flesh tone translucent plastic frames or non-reflecting opaque blue-gray (slate). Extra rigid frame retains original shape without bowing. Broad bearing nosepads give feather-touch distribution of weight. Lenses are interchangeable—permitting easy lens replacement on right or left side.

In 3 sizes • 44 x 37mm (No. 375), 36 x 39mm (No. 376), 48 x 41mm (No. 377)

CESCO FLEXIBLE PLASTIC GOGGLES

Light...durable...CESCO Flexible Plastic Goggles give all-around protection from dust, splashing liquids and impact from any direction. Made of soft vinyl plastic, they conform to fit snugly around eyes and over nose, even when personal glasses are worn. Small perforations in goggle sides provide necessary ventilation...eliminates lens "clouding." Full vision curved lens gives superior wrap-around vision. Comes with adjustable elastic headstrap.

In 2 styles • No. 565C (clear plastic lens) No. 565G (green plastic lens)

CESCO CUP-TYPE GOGGLES

Individually formed eye cups give the assurance that these No. 545-C goggles will fit snugly and comfortably on any worker. Adjustable Comfort-King headband of round moulded rubber cannot kink, twist or curl...has no buckles or sharp edges to snag hair. Ventilated cups are made of moulded brown thermoplastic...lightweight and sturdy. Simple bridge adjustment guarantees correct fit on all faces. Cup-type goggles are fitted with 50 mm Super-Safety lenses.

No. 548-C • 20% larger for prescription glass wearers. Otherwise, same as above

No. 545-T • Same features as 545-C except with transparent cups

CONTACT THE CESCO DISTRIBUTOR NEAREST YOU FOR ANY SAFETY EQUIPMENT NEED

ATLANTA, GA. Guardian Safety Equipment Co.
BATON ROUGE, LA. Guardian Safety Equipment Co.
BIRMINGHAM, ALA. Industrial Safety Supply Co.
BOSTON, MASS. General Equipment Corporation
BUFFALO, N. Y. The Watson Company
CHICAGO, ILL. Universal Safety Equipment Co.
CINCINNATI, OHIO Williams & Co., Inc.
CLEARWATER, FLORIDA Car-Mad Equipment Company
CLEVELAND, OHIO Williams & Co., Inc.
COLUMBUS, OHIO Williams & Co., Inc.
DALLAS, TEXAS Guardian Safety Equipment Co.
DETROIT, MICH. Averill Equipment Company
HOUSTON, TEXAS Guardian Safety Equipment Co.
KANSAS CITY, MO. Safety, Incorporated
KNOXVILLE, TENN. Safety Equipment Distributing Co.
LOS ANGELES, CALIF. Guardian Safety Equipment Co.
LOUISVILLE, KENTUCKY Williams & Co., Inc.
MILWAUKEE, WIS. Universal Safety Equipment Co.
NEW YORK, N. Y. (See ORANGE, N. J.)
ORANGE, N. J. Guardian Safety Equipment Co.
PEORIA, ILL. Standard Industrial Products Co.
PHILADELPHIA, PA. Guardian Safety Equipment Co.
PITTSBURGH, PA. Williams & Co., Inc.
ST. LOUIS, MO. Safety, Incorporated
ST. PAUL, MINN. Continental Safety Equipment, Inc.
SALT LAKE CITY, UTAH Universal Safety & Fire Equipment
SAN MATEO, CALIF. Guardian Safety Equipment Co.
TOLEDO, OHIO Williams & Co., Inc.
TULSA, OKLA. Guardian Safety Equipment Co.
MEXICO CITY, D. F. Safety Equipment, S. A.
EDMONTON, CANADA Soper-Singleton Electric Co., Ltd.
MONTREAL, CANADA The Better Optical Company, Ltd.

Workers Will Wear

Fendall

FACE and EYE
Protection Equipment

Workers willingly wear Fendall protective equipment because solid comfort is built-in, together with absolute safety. Each item in the Fendall line incorporates many distinct features and advantages. They meet and far exceed all requirements of Federal specifications. To provide your workers with Fendall equipment is a big step toward accident prevention and increased production. You can be sure your workers will wear Fendall equipment willingly.

spectacle-type goggles

SIDE SHIELD MODEL

Fendall spectacle-type goggles are available in both acetate and metal frames in a wide variety of styles and sizes, with or without side-shields. Styled to give appearance of personal glasses with built-in safety and comfort. Optically correct, high-safety-factor lenses. New temple adjustment feature. Completely new design places Fendall spectacles in a class by themselves.

cup-type goggles

Many styles for chipping, grinding, welding, dust and splash hazards. Regular and coverall models. Fashioned to fit the face with eye cups individually molded for perfect fit. Many exclusive features make Fendall cup-type goggles your safest buy . . . your best buy.

FENDALL ALSO PROVIDES A COMPLETE LINE OF ADJUSTABLE FACE SHIELDS. A COMPLETE Rx SERVICE IS ALSO AVAILABLE FOR PRESCRIPTION GROUND LENSES.

Write for Complete Details Now!

FENDALL PRODUCTS FEND ALL HAZARDS

FENDALL COMPANY

4509 N. LINCOLN AVENUE, CHICAGO 25, ILLINOIS

Circle Item No. 80—Reader Service Card

Respiratory

—*From page 100*

ABRASIVE BLASTING SUIT provides filtered air and mechanical protection for head, neck and eyes.

for atmospheres immediately hazardous to life where the wearer could not escape if failure of the air supply required him to remove the respirator.

This respirator differs from the hose mask mainly in two features: it has a hand-operated, quickly detachable coupling connected to the belt or body harness so that the operator can connect to a compressed air hose, also a flow-limiting device to permit air flows only between 2 and 20 cfm.

A trap and filter installed in the compressed air line ahead of the masks to separate oil, water, scale, or other extraneous matter from the air stream is desirable.

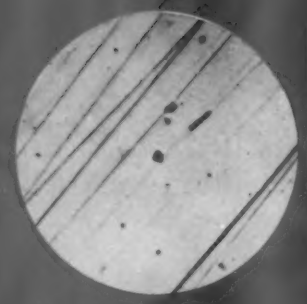
An air-pressure regulator in the line is required if air is supplied at a pressure in excess of 25 psi., also a pressure release valve which will operate if the regulator fails.

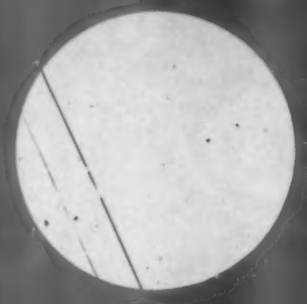
Supplied-air respirators are the best type for continuous use at one location. Other types may give adequate protection, but offer breathing resistance and are consequently more fatiguing.

To obtain clean air, the compressor intake must be kept away from sources of contamination. The compressor should be well maintained. It must not run too hot, as dangerous amounts of car-

—*To page 110*

SCRATCHED LENSES CAN CAUSE ACCIDENTS





Testing Laboratory

OBJECT: Wipe plastic safety shield lenses with silicone impregnated lens tissue and with Lensclean rayon lens tissue to determine if either or both tissues scratched the plastic surface.

RESULT: After both tissues had been used to wipe the plastic lenses the lenses were examined microscopically. Lens wiped with silicone tissue had by far more scratches.

CONCLUSION: The use of Lensclean rayon tissue reduces by a great extent the amount of marring or scratching of a plastic lens surface.

*Extract of a report from A Leading Independent Eastern Testing Laboratory

NEW

RAYON "LENSCLEAN" TISSUE
Economically Reduces this Safety Hazard

A specific Lenscleaning Tissue for a specific job.

SILICONE

Low in cost, these uniformly impregnated silicone tissues are made with 100% flax (Linen) base paper.

Expressly designed for use on either eyeglasses or any finely ground optical surface, no other tissue is superior in quality or more economically priced.

Simply dispensed from a metal dispenser which can be quickly installed any place throughout your plant.

RAYON

Barely visible scratches on plastic lenses of Safety Goggles impair vision, cause continual eye strain and body fatigue . . . increasing the possibility of accidents.

Lensclean R-24 Rayon tissues were developed to meet U.S. Government Specifications for a wiping tissue that is virtually non-scratching. Each long-fibre (¼" or more) tissue has high wet strength to prevent shredding or tearing when used.

Economically priced each tissue is easily dispensed from an attractive dispenser.

Both Rayon R-24 and Silicone S-3C Lensclean tissues will fit any standard size 3 x 7" dispenser. Information and samples on request.

lensclean inc.

Lens tissues since 1922

135 WEST 25th STREET, NEW YORK 1, N.Y.

Circle Item No. 75—Reader Service Card

The Bausch & Lomb T-60 Two-Tone frames (right) established a new industry standard.

You get so much MORE out of B&L

ACETATE Y-60

METAL M-40

COMBINATION Y-90

+**PROTECTION** • Frames unsurpassed in strength and durability. Bal-SAFE lenses—plain or prescription—give *maximum impact resistance.*

+**ECONOMY** • Exclusive "integrated" design of line (interchangeable parts and accessories) means smaller inventory. Frame life expectancy is demonstrably greater.

+**WORKER ACCEPTANCE** • Products of nation's top ophthalmic specialists—expert in modern eyewear development—styling and comfort.

PROTECTION-PLUS Safety Glasses!

When you standardize throughout your plants on Bausch & Lomb Safety Eyewear, you're in the best possible position to demonstrate—to workers AND management—the wisdom of your choice. You get maximum protection *plus* economy *plus* your workers' hearty OK. Want to be "filled in" on the latest in this line? Then please call the Bausch & Lomb supplier in your area, or write: Bausch & Lomb Optical Co., 90327 Smith St., Rochester 2, N. Y.

BAUSCH & LOMB

SINCE B&L 1853

WISE TO CHOOSE - SAFE TO USE

K-LENS-M LENS CLEANING CABINET For SAFE CLEAR VISION

Model #200 Cabinet with #300 Anti-Fogging Station

Cleans and Anti-Fogs All Types of Personal and Protective Eye Wear

THE MODERN LIQUID METHOD FOR THOROUGH CLEANING AND ANTI-FOGGING OF GLASS OR PLASTIC

Effective - Economical
Easy to Install, Use and Service

K-LENS-M
REG. U.S. & CAN. PAT. OFF.

Circle Item No. 77—Reader Service Card

Respiratory

—*From page 106*

bon monoxide can be produced by decomposition of lubricating oil.

Air-supplied suits. Sometimes rescue or emergency repair work must be done in atmospheres extremely corrosive to the skin and mucous membranes, in addition to being acutely poisonous. For these conditions, complete suits of impervious material with breathing equipment are available.

If a hose line is used, it should be connected to the suit itself as well as to the helmet. Unless well ventilated, such a suit is fatiguing and dangerous to wear for long periods.

Abrasive Blasting

Abrasive blasting requires an adequate supply of filtered air, also mechanical protection for the head and neck—either an impregnated cloth hood or a helmet of some rigid material. It should be covered both inside and outside with a plastic material, such as soft rubber, to increase both comfort of wearer and resistance to abrasive.

A window of transparent material, suitable for optical use, protected from the abrasive by a 30- to 40-mesh fine wire screen should be provided. Both window and protective screen should be readily replaceable.

Self-Contained Apparatus

For work in atmospheres immediately hazardous to life at distances more than 150 ft. from the source of fresh air, self-contained oxygen-breathing apparatus should be used.

Two principal types of self-contained apparatus are: (1) Compressed air or compressed oxygen type; (2) Internal generation type which produces oxygen by reaction of chemicals in the canister with the moisture in exhaled breath.

Care of Equipment

A central station for care and maintenance of respiratory equipment is desirable where many respirators are in use. Such a unit can also handle distribution and maintenance of other personal protective equipment.

Each employee should be provided with two respirators and either a locker or a hook at the central station. Each respirator should be branded or tagged with the employee's number.

Cleaning and disinfecting. All parts, except canisters and car-

tridges, should be cleaned after use. Facepieces, air lines and hose may be washed with soap and water, rinsed, and dried.

All respiratory devices should be disinfected before being passed from employee to employee. Methods of sterilizing include:

1. Immersion in solution of quaternary ammonium salt detergent. This material is not injurious to skin or to rubber.
2. Subjection to a moist atmosphere of antiseptic gas, such as formaldehyde, for 10 minutes.
3. Immersion for 10 minutes in a solution of formalin made by dissolving 1 part of 40 per cent formaldehyde in 9 parts of water.

Parts should be rinsed thoroughly after sterilizing to remove traces of disinfectant, then dried.

Elastic head bands may be damaged by sterilizing but they should be washed with soap and water. Bands should be replaced when the respirator is transferred to another employee.

The respirator should be turned in to the central station at the end of each shift to be cleaned and sterilized, and repaired if necessary.

Where the maintenance crew works several shifts, one respirator per employee may be sufficient. Usually, however, it is necessary to have one complete unit in the process of cleaning while the other is being worn.

Filters should be replaced when clogged, and used ones discarded. Canisters should be replaced at regular intervals. Even when not in use they lose their effectiveness with time. * * *

Training in Use of Respiratory Equipment

Respirators are often used as emergency equipment under conditions of strain and excitement. Those who will have to use them should therefore be trained thoroughly.

Regular inspection is also necessary to avoid deterioration of equipment which is not used regularly.

Training

1. Train each person in putting mask on and adjusting it rapidly to his face.
2. Have each person wear it long enough to become accus-

Circle Item No. 78—Reader Service Card

Better Vision Products

The ALL NEW K-LENS-M SKYSCRAPER GOGGLE CLEANING STATION

#405

Greatly reduces maintenance time—holds 1400 sheets of K-LENS-M Lens Tissue (7 boxes—200 sheets each, interfolded) and a full 16 oz. bottle of K-LENS-M Lens Cleaner. Mounts in space approximately 4½" wide by 28¼" high. Visual flow of tissue boxes tells at a glance when refills are needed. Model #200-G16

New squeeze bottle of K-LENS-M Lens Cleaner. Ideal for personal, desk or bench use. Unbreakable, attractive, refillable and appropriate for office or plant use.

#620

K-LENS-M Lens Tissue in the new desk-size box. Convenient for office desks and work benches where a bottle of K-LENS-M Lens Cleaner is handy. The same as used in the K-LENS-M Skyscraper. Tissue is lint-free, interfolded to feed one at a time.

Send for Free Test Sample and complete information on your company letterhead.

THE WILKINS CO., INC.
Cortland 1, N.Y., U.S.A.

• Lens Cleaning Cabinets • Lens Cleaner • Lens Tissue • Anti-Fogging Stations • Anti-Fogging Liquid

tomed to the breathing resistance and to putting it on and taking it off.

3. Repeat training at regular intervals.

Maintenance

1. Set up a card for each mask to indicate date of latest inspection and replacement of canister and amount of use, if any, which canister has had.

2. Replace canisters at least annually, even if not used.

3. When a canister is replaced, examine facepiece, harness, hose, and headbands for leaks or deterioration. Replace defective parts.

4. Canisters are ordinarily supplied with seals to keep out air while in storage. Remove seals when canister is placed in service.

5. Store mask in a place accessible to hazardous area, and as cool and dry as possible.

6. If mask is for emergency use only, canister should be replaced after use. * * *

POTENTIAL ASPHYXIA HAZARDS

(Globe Industries, Inc.)

Class	Type	Preventive Measures
1. Diseases	a. Cardiac conditions b. Asthmatic and circulatory cases c. Hypertension sufferers	Regular physical checkups; Constant surveillance and encouragement to observe the doctor's suggested regimen; Employee instruction and job selection.
2. Equipment	a. Chemical, oil tanks b. Vats and containers c. Poorly ventilated rooms	Hoods over tanks, etc. Exhaust systems Make-up air systems Oxygen masks (self-contained breathing apparatus) where required for special areas and jobs. Employee training.
3. Electricity	a. Power and transmission lines b. Powered equipment c. Transformers d. Portable power tools e. Lightning	Signs, identifying color, guard rails and fences. Continuous maintenance and visual inspection of tools. Proper grounding of tools. Isolation of areas. Employee training.
4. Asphyxiating gases	a. Carbon monoxide b. Exothermic and endothermic atmospheres c. Carbon dioxide d. Volatile hydrocarbons	Signs, identifying color, guard rails and fences. Hoods and exhaust equipment. Continuous atmosphere sampling and checking with detecting equipment. Regular maintenance of all equipment, pipes, fittings and tanks. Oxygen masks (self-contained breathing apparatus) where required for special jobs and areas not rendered safe by the other methods. Employee training.
5. Chemical irritants	a. Chlorine b. Ammonia c. Hydrochloric acid d. Hydrogen sulphide e. Lime f. Sulphur g. Hydrofluoric acid gas h. Nitrous fumes i. Bromine j. Beryllium k. Chloride of lime l. Nitric acid m. Phenols n. Phosgene o. Anticholinesterase agents p. Benzol q. Naphthol r. Sulphuric acid s. Hydrocyanic acid	

Handicapped Needed Says U. S. Chamber Head

American industry today needs the skills and production of the physically handicapped worker more than ever before, Philip M. Talbott, president of the Chamber of Commerce of the United States says in the December 1957 issue of *Performance,* monthly publication of the President's Committee on Employment of the Physically Handicapped.

"To an extent greater than ever before," Mr. Talbott said, "The right men and women for the jobs will come from the physically handicapped. For the infirmities that put them at a disadvantage in doing some things are compensated by unusual powers in doing other things.

"Medical authorities tell us, for instance, that poor eyesight is often compensated by keen hearing and sensitive touch. From our own observation, we know that if the muscles in one part of a man's body are incapacitated, he naturally develops extra strength and adroitness in another part. And businessmen have learned by experience that handicapped persons generally have a strong determination to prove their worth, to excel in whatever tasks they are assigned.

"Such resolution, sharpened senses, and skillful muscles, together with well-trained minds—that's the stuff for the work of tomorrow."

USSSCO the Complete Line for Every Eye Protection Need

Industry's Newest, Strongest, Most Popular

THE USSSCO

S-7 SAF-I-SPECTACLE®

PLASTIC FRAMES
in bronze or flesh • 4 Eye Sizes, 5 bridge widths • with integral or adjustable Nose Pads • choice of flat fold or regular Side Shields • spatula or riding bow Temples.

SMART, modern styling that appeals to both men and women. New lightweight wearing comfort.

HIGHER IMPACT LENSES
in USSSCO's new OPTILITE® lens material. Or Hardened Safety Glass, if desired. S-7 lenses are *interchangeable* — the same lens fits either right or left side.

PLANO OR INDIVIDUAL PRESCRIPTION LENSES
(single vision or multifocals) in *either* OPTILITE or Hardened Glass.

GREATER STRENGTH in new straight-line frame design, stronger and more rigid bridge and eyewires. Deep molded lens channels lock lenses securely against impacts.

ALSO AVAILABLE in new-styled modern metal frames, with choice of metal spatula temples with plastic paddle tips, or cable type • 4 eye sizes, 5 bridge widths.

A Chemical Goggle that Won't Fog
NEW AIRFLOW® SAF-I-CHEM®
Twice the ventilation . . . patented baffles keep out liquid splashes. Weighs only 3 oz.

Guaranteed Non-Fogging
NEW AIRFLOW® SAF-I-FLEX®
Cover goggle with soft, tough vinyl frame for impact protection, and generous wrap-around nickel-steel screen for maximum ventilation.

For the Careful Buyer
"THRIFTY" SAF-I-FLEX®
Highest quality, lowest cost cover goggle of its type today.

Low-Cost 1-Piece Eye Shield
SAF-I-SHIELD®
The original all-purpose plastic cover goggle—and still the leader!

Light Weight, All-Plastic
SAF-I-SPEC®
Bright, attractive bronze or slate blue frames. New modern styling. Weighs less than 1 oz. Available with side shields.

"HALO"® FACE SHIELD
Light weight, all-plastic, with green anti-glare plastic spark protector, and patented hinge.

ALSO MADE BY USSSCO:
"PEP-UP®" SALT TABLETS • SAF-I-CUP GOGGLES FOR WELDERS AND CHIPPERS • SAF-HED® PROTECTIVE HATS • "TUFFY®" VINYL APRONS • SAF-CO-METERS® FOR DETECTING CO IN THE AIR • SAF-I-WELD® WELDING LENSES • SAF-I LENS CLEANERS AND GOGGLE CLEANING STATIONS.

All USSSCO Safety Eyewear meet American Standards Association Code for optical qualities, impact and piercing resistance, etc.

Write for complete USSSCO Catalog

All equipment in the USSSCO line is designed, manufactured, and sold direct to the user by United States Safety Service Company. There's a trained, full-time USSSCO Safety Service Engineer near you. See Yellow Pages, or write Kansas City.

UNITED STATES SAFETY SERVICE CO.
BRANCHES IN PRINCIPAL INDUSTRIAL CITIES

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Div. A-3, 1547 Walnut St., Kansas City 8, Missouri

Circle Item No. 79—Reader Service Card

Head Protection

HEAD INJURIES caused by falling objects are a serious hazard in many industries. The hard hat, first introduced in mines shortly after World War I and much improved since then, has an impressive record of lives saved. Head protection has become standard practice in other industries, including construction, logging, shipbuilding, and many types of maintenance work.

Head protection is also becoming general among public utility companies where linemen wear protective hats for protection against live wires overhead as well as against impact.

Protective hats are also useful where there is danger of bumping the head against overhead structures.

Wearing protective hats is included in many labor contracts and the unions have helped in educating their members on the need for head protection.

Requirements. A protective hat should have:

1. Resistance against impact.
2. Resistance to fire.
3. Resistance to moisture.
4. Light weight.
5. Insulation against electricity around live equipment.

Types. The type in general use has a brim all the way around, protecting the head, face and back of the neck.

The cap type is sometimes preferred where a brim might be in the way.

Some models have brackets to support miners' cap lamps or welding masks.

Construction

Materials most widely used are laminated plastic, glass fiber, and aluminum alloy.

Laminated plastic molded under high pressure provides a hat that resists impact and effects of water and oil. It provides effective insulation against electricity.

Glass fiber impregnated with resin has a high-strength-weight ratio, high dielectric strength and resistance to moisture, caustics, and acids.

Aluminum alloy is light in weight and meets all requirements for resistance to impact and moisture, but it is a good conductor of electricity. Metal hats should not be worn where there is danger of electrical contact.

The hard shell of the hat is supported by a cradle or hammock which keeps the shell away from the hat, cushions it against blows, and permits circulation of air around the head.

Cradle and sweatband should be replaceable because of deterioration through perspiration. This is important for sanitary reasons, since hats may be worn by more than one person. The shell can be sterilized by any of the common methods.

For cold weather a lining of water-resistant cloth may be attached to the hat to protect head, neck and ears.

On locations exposed to strong winds, such as bridges and oil derricks, a chin strap is useful.

An eyeshield of transparent plastic may be attached to some types of hats. It is hinged under the peak and lies flat against the peak when not in use.

Weight. A maximum of 14½ oz. for the complete hat is specified by Federal Specifications No. 367A (U.S. Treasury Department, Procurement Division). The specification also lists tests which hats must pass. These include moisture, impact and electricity.

Colors. Hats are available in seven standard colors — white, gray, red, green, blue, brown, and black. Other colors are available on special order. Color is permanent because it goes all the way through the material.

Special colors are sometimes ordered, or stock hats painted, to match the color used by the company on vehicles, in advertising, etc.

Hats which glow in the dark are obtainable on special order.

Distinctive colors and designs are also used to designate the wearer's department or trade. This is often done in plants where certain areas are restricted to authorized employees.

No standards have yet been compiled for the use of color for identification of the wearer. Many civil defense groups have established codes and some industries have adopted similar plans. Typical of these is the code developed by the Higgins Company, New Orleans.

Red—Pipe workers
Blue—Fitters
Green—Welders

—*To page 116*

EACH MAN has his own hat identified by name or monogram. Clean, serviceable work garments are also provided for each employee.

B700

New "Squared Shape" bronze plastic frame glasses with S-7 interchangeable lenses. Vinyl coated temples.

328

New fibre glass face shield, with ratchet headgear. Detachable windows; resists heat and moisture.

700S

New plastic frame safety glasses with flesh color frames and side shields. S-7 lenses, vinyl temples.

900

New well-ventilated chipping goggles with sturdy plastic eyecups. Wide field of vision; comfortable to wear.

621

New Jumbo chipping goggles with rigid nose bar. Double-filter ventilation; easy face adjustment.

810

New extra-large, lightweight vinyl "soft sides" with easy lens replacement, more comfort, better ventilation.

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FACE AND EYE SAFETY EQUIPMENT

SELLSTROM SAFETY EQUIPMENT has been designed and manufactured to provide the maximum face and eye protection for every user. Shown here are typical Sellstrom Safeguards . . . new quality products developed from 35 year's experience in SERVING SAFETY SPECIFICALLY.

WRITE TODAY for your free Sellstrom Catalog . . . name of the Sellstrom dealer in your community. No obligation . . . ever!

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MANUFACTURING CO.

222 South Hicks Road • Palatine, Illinois

Serving Safety Specifically Since 1923

Circle Item No. 81—Reader Service Card

Head Protection

—*From page 114*

Buff—Rigging
Yellow—Electrical
Black—Labor
Gray—Burning
Brown—Carpenters
Brown bottom, white top—Painters
Red bottom, blue top—Machinists
Gray bottom, white top—Shear and blacksmith shops
Lavender—Expediters
Aluminum—General foremen
Brown bottom—yellow top—Caulkers and sanders

A black line on a helmet denotes a foreman and a red line a leaderman. Badge numbers are also stencilled on the front of each helmet.

Work Caps

Where protection against impact is not required, light cloth or paper caps are worn to protect the hair against paint splashes, dust, oil, and other non-corrosive substances.

One type of disposable work cap is of heavy Kraft paper treated with neoprene and a flame retardant. The material is water-repellent and resistant to acids and alkalis. Cost is about 30 per cent less than most cloth caps.

Headwear for Women

Women are seldom employed in peace-time occupations where protective hats are required. Their hair, however, provides a problem around moving machinery. Much effort has been expended in designing headwear that provides adequate protection and is reasonably attractive in appearance. Much more effort is expended in getting them to wear it.

Scalping may occur at points where hair may come in contact with rotating parts, or where enough static is produced by the machine to lift the hair.

Enclosing the machine may be practicable in some operations but women who work around machinery should wear caps which cover the hair completely. Hair covering is generally desirable from the standpoint of cleanliness.

Hair covering should be made of durable fabric which will withstand repeated laundering. Design should be simple so that pressing may be done by machine.

Flame-retardant material should be used if worn near sparks or flame.

Caps with peaks provide warning before the head comes in contact with a moving object. They should be provided in a sufficient variety of head sizes or with a range of adjustment to fit all persons.

Hair nets, turbans, or berets, preferred by many women, are not considered sufficient protection around moving machinery. Sometimes their use is a compromise with feminine taste. * * *

Eye Conservation

—*From page 96*

Hoods and Helmets

Hoods (loose-fitting) and **helmets** (rigid frame) of various types are worn to protect the face and head against hazards which do not involve heavy impact.

These are equipped with windows but goggles may be worn underneath. If toxic fumes, dusts or gases are encountered, an air line should be supplied. As these hoods are rather warm, an air line may also be desirable for comfort.

Fabric hoods protect the wearer from nuisance dusts, paint spray, etc.

Fire-resistant duck and asbestos hoods are used for varying degrees of exposure of heat, as in furnace and burning operations and fire fighting.

Hoods and helmets of rubber, neoprene, plastic film, and fabric impregnated with rubber or plastic provide protection against splashes of acids, caustics, organic solvents, etc. Not all of these materials are resistant to all exposures and the manufacturer should be consulted.

Harmful Rays

Glass which filters out harmful ultraviolet and infrared rays is available in many types of goggles, face shields and helmets. These filter lenses are worn for welding and cutting, furnace and boiler observation and other operations where there are high temperatures and excessive glare.

Didymium glass is used for protection against bright yellow encountered in glass blowing and similar operations. It is also useful for some precision operations in laboratories.

Melters' goggles of cobalt blue glass come in spectacle and cup types in graded shades. Lenses with color in the upper half and clear glass in the lower half are also obtainable.

Sun glasses are not effective ray-filter glasses for most industrial exposures. They are designed for protection against discomfort caused by sun glare. The better glasses conform to optical standards but many of the cheaper ones show considerable distortion.

Welding helmets provide protection for the eyes and face under the severe conditions of arc welding. They are attached to headgear so they can be raised for placing the work. Impact goggles worn under the helmet provide protection when the helmet is raised.

Helmets are made of dielectric fiber resistant to sparks, molten metal, and flying particles, and having low heat conductivity. Replaceable cover glass protects filter plate.

Some helmets have a lift-front glass holder which permits rapid inspection of work without removing helmet.

Welding hand shields are used on operations where a helmet is not practical, and on tack welding, set-up work, inspection, and time study work. Construction is similar to welding helmets.

Filter Lenses. The following shade numbers are listed in National Bureau of Standards Handbook H24:

No. 3—For protection against glare or reflected light, spot welding, light brazing.

No. 4 or No. 5—Light acetylene cutting and burning.

No. 6—General acetylene welding,

NEW DIRECTIONS IN SAFETY...by Pulmosan

FUME RESPIRATOR # C-261 . . . Only Single Cartridge Respirator approved for fumes and dusts by U.S. Bureau of Mines . . . Approval #2171

FACE SHIELDS PS 100 . . . one of four series . . . Adjustable, unbreakable plastic . . . snap-in-out sweatband . . . extra wide visor.

SAND BLAST HOOD # 30 . . . Low cost protection under moderate blasting conditions . . . lightweight . . . wire screen or laminated glass with wire screen window.

STOPS FOG STATION . . . Cleans and antifogs goggles with one solution, one application. Throw away when tissues and solution are exhausted.

Pictured above are four examples of Pulmosan research and development . . . bringing to American Industry the most advanced safety appliances . . . the most trusted and economical plant safety equipment. Complete catalog of Pulmosan safety equipment is your for the asking.

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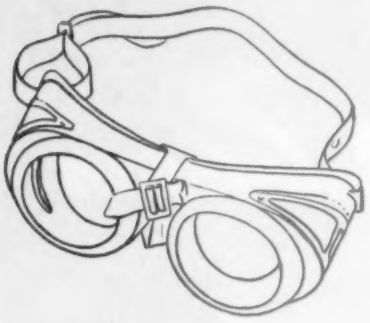
SAFETY EQUIPMENT CORPORATION
644 Pacific Street, Brooklyn 17, N.Y. • 1007 Washington Ave., St. Louis, Mo.

Circle Item No. 82—Reader Service Card



CUP-TYPE heavy duty goggles are worn for the more severe exposures.

or welder's helper or set-up on arc welding.

No. 8—Heavy acetylene welding or cutting, or very light arc welding.

No. 10—Arc welding up to 250 amperes.

No. 12—Arc welding of more than 250 amperes, atomic hydrogen welding.

No. 14—Carbon arc welding.

Goggles are available in shades up to No. 8; higher numbers in helmets.

Heat-treated cover lenses can be provided to protect filter lenses against pitting and scratching. Heat-treated filter lenses are also available.

Administering the Program

Supply and distribution. Some companies keep the stock in a central supply department. In larger plants, goggles, shields and repair parts may be kept in each shop.

WELDING HELMETS of dielectric fiber with low heat conductivity are resistant to sparks, molten metal splashes and flying particles. Filter plate is protected by cover glass.

In some plants, goggle carts with trained attendants make regular rounds cleaning, adjusting, repairing, and replacing goggles on the job.

Fitting. All goggles, plano as well as prescription, should be fitted carefully. Glasses that don't fit can cause a lot of opposition to eye protection.

Some optical companies offer instruction in fitting plano goggles. Prescription glasses should be fitted by a refractionist.

Cleaning. Goggles and spectacles become smudged and facilities on the job encourage frequent cleaning. Cleaning stations may dispense silicone-treated tissues or cleaning liquid and tissues. Only the latter should be used for plastic lenses.

PLASTIC lenses are light in weight and will withstand considerable impact.

Sterilizing. Goggles worn by one employee should be sterilized before reissue. Ability to withstand sterilizing by accepted methods should be included in any specifications.

Who Pays? For plano goggles, the most common practice is for the company to issue them without cost to employees and to repair or replace those damaged on the job. Often a deposit is required to discourage loss of equipment.

Few companies provide prescription goggles without charge but many assume varying percentages of the cost of refraction and the glasses.

Vision Tests Include . . .

Near acuity. Ability to focus and see well with both eyes separately at a distance of 15 in. This is the distance at which most machine and office work is done.

Distance acuity. Ability to focus eyes at a distance of 20 ft. or more. This is necessary for crane operators, jeep and truck drivers, and railroaders, for example.

SPECTACLE-TYPE goggles furnish adequate protection for many jobs. Side shields are also needed for some.

Field of vision. Ability to see to both sides, and up and down, while focusing on a small target.

Depth perception. Ability to judge space relationship. This is important for accuracy in almost any job. * * *

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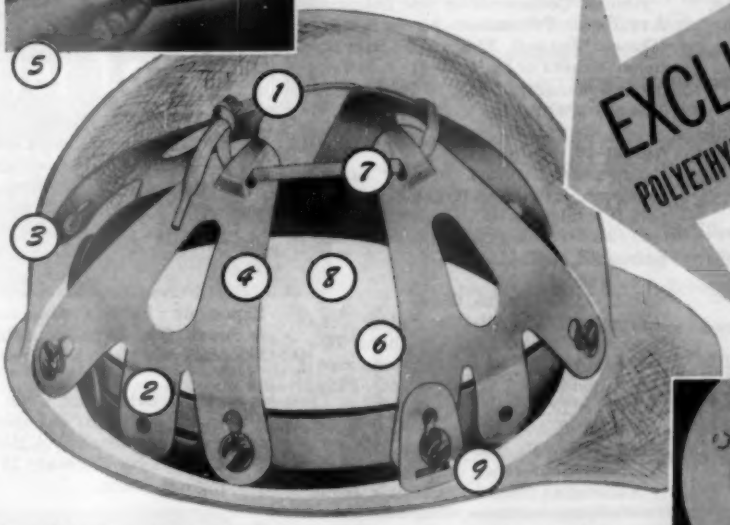
"MOST WANTED"

HERE'S WHAT MAKES ALL A FIBRE-METAL SAFETY HATS & CAPS SO COMFORTABLE and the world's BEST SELLERS!



EXCLUSIVE! POLYETHYLENE SUSPENSION ...strong, pliable, COMFORTABLE

(1) Entire "suspension" is soft and pliable (including headband) . . . automatically conforms to head.

(2) NO METAL PARTS.

(3) Suspension interchangeable in *SuperGlas, SuperLite, SuperLectric* Hats and Caps.

(4) Suspension is *polyethylene* . . . will not mildew, sour or rot. Easily cleaned or sterilized . . . unaffected by detergents.

(5) Headband, of softly pliable polyethylene, conforms to head . . . adjusts to any head size from 6⅝ to 8.

(6) All edges of suspension rounded for comfort. No hair pulling!

(7) Laces are recessed to prevent discomfort . . . adjust for depth.

(8) Deep suspension keeps hat or cap on head firmly in any working position.

(9) Provision for chin strap in every hat and cap.

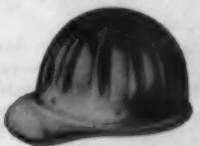
Suspension removable, but ONLY headband-sweatband need be replaced . . . saves time and 30% replacement cost. No dangerous metal parts.

Ask your Welding & Safety Supply Distributor for bulletins . . .

SuperGlas
(formerly *SuperGard*)
Fibreglas Safety Hats & Caps

SuperGlas
Safety Cap with
Miner's Lamp Bracket

SuperLectric
ELECTRICAL
Safety Hats & Caps



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ALUMINUM
Safety Hats & Caps

In CANADA: Fibre-Metal (Canada) Limited, Toronto

Visit Us at the A.W.S. Welding Show . . . Booth 136

OVER 50 YEARS OF WELDING & SAFETY

The FIBRE-METAL Products Company | Chester Penna.

Circle Item No. 83—Reader Service Card

COMING EVENTS

in the safety field

Mar. 17-19, Dallas, Tex.
Nineteenth Annual Texas Safety Conference (Adolphus Hotel). J. O. Musick, general manager, Texas Safety Association, Inc., 830 Littlefield Bldg. Austin, Tex.

Mar. 17-18, Boston
Thirty-seventh Annual Massachusetts Safety Conference and Exhibit (Hotel Statler). Bert R. Harmon, assistant manager, Massachusetts Safety Council, 31 State St., Boston 9.

Mar. 17-19, Los Angeles
Fifth Annual Western Safety Congress and Exhibits. Joseph M. Kaplan, manager, Greater Los Angeles Chapter, National Safety Council, 3388 W. 8th St., Los Angeles 5.

Mar. 18-19, Fort Wayne, Ind.
Northeastern Indiana Safety Conference and Exhibit. Ivan A. Martin, manager, Safety Council, Chamber of Commerce of Fort Wayne, Ind.

Mar. 25-27, Pittsburgh, Pa.
Thirty-third Annual Western Pennsylvania Safety Engineering Conference and Exhibit (Penn-Sheraton Hotel). Harry H. Brainerd, executive manager, Western Pennsylvania Safety Council, Inc., 605 Park Bldg., Pittsburgh 22, Pa.

Mar. 25-28, Washington, D. C.
President's Conference on Occupational Safety. Director, Bureau of Labor Standards. Department of Labor, Washington 25, D. C.

Apr. 9-11, Gainesville, Fla.
Fifth Annual Conference on Accident Prevention Engineering (University of Florida). Donald B. Wilcox, conference coordinator, Department of Industrial Engineering, University of Florida, Gainesville, Fla.

Apr. 9-11, St. Louis. Mo.
Central States Safety Conference (Hotel Chase). Wm. F. Yorger, managing director, Safety Council of Greater St. Louis, 722 Chestnut St., Suite 321, St. Louis 1, Mo.

Apr. 14-18, New York
Twenty-eighth Annual Safety Convention and Exposition of the Greater New York Safety Council (Hotel Statler). Paul F. Stricker, executive vice-president, 60 E. 42nd St., New York 17.

Apr. 15-17, Detroit, Mich.
Twenty-eighth Annual Michigan Safety Conference (Sheraton Cadillac Hotel). Ben Duguid, executive secretary, 16130 Northland Dr., Detroit 35, Mich.

Apr. 16-17, Indianapolis, Ind.
Eleventh Central Indiana Safety Conference and Exhibit. (Claypool Hotel). Jack E. Gunnell, director, Indianapolis Safety Council, Chamber of Commerce, Indianapolis, Ind.

Apr. 19-25, Atlantic City
Thirteenth National Industrial Health Conference (Convention Hall). Dr. Edward C. Holmblad, managing director, Industrial Medical Association, 28 E. Jackson Blvd., Chicago 4, Ill.

Apr. 21-22, Toronto, Ont.
Annual Conference of the Industrial Accident Prevention Associations (Queen Elizabeth Bldg., Canadian National Exhibition). R. G. D. Anderson, general manager, IAPA, 90 Harbour St., Toronto 1, Ont.

Apr. 21-26, Atlantic City
Nineteenth Annual Meeting of the American Industrial Hygiene Association (Claridge Hotel). George D. Clayton, executive secretary, 14125 Prevost, Detroit 27, Mich.

Apr. 22-24, Columbus, Ohio
Twenty-eighth All-Ohio Safety Congress and Exhibit (Deshler-Hilton Hotel). Arthur W. Moon, congress manager, Room 611, Ohio Dept. Bldg., Columbus 15, Ohio.

May 1-3, Norfolk, Va.
Annual Conference of Virginia Safety Association (Monticello Hotel). James T. Wadkins, manager, 2501 Monument Ave., Richmond, Va.

May 5-7, Allentown, Bethlehem, Easton, Pa.
Thirty-first Eastern Pennsylvania Safety Conference. Harold E. Seward, Lehigh Valley Safety Council, 602 E. 3rd St., Bethlehem, Pa.

May 6-8, Buffalo, N.Y.
Eighteenth Western New York Safety Conference and Exhibit (Hotel Statler). Clifford H. Seymour, executive secretary, P.O. Box 315, Niagara Falls, N. Y.

May 7-8, Cedar Rapids, Iowa
Fifth Annual Safety Conference of the Industrial Safety Association of Iowa (Sheraton-Montrose Hotel). Pegge Resch, executive secretary, 611 Central National Bldg., Des Moines, Iowa.

May 8-9, Baltimore, Md.
Governor's Annual Safety-Health Conference and Exhibit (Lord Baltimore Hotel). Joseph A. Haller, executive chairman, Department of Labor and Industry, 12 E. Mulberry St., Baltimore 2, Md.

May 14-16, Asheville, N. C.
Twenty-eighth Annual North Carolina Statewide Industrial Safety Conference (Battery Park Hotel). H. S. Baucom, director of safety, North Carolina Industrial Commission, Raleigh, N. C.

May 19-23, Chicago
Sixty-second Annual Meeting of the National Fire Protection Association (Palmer House). Robert W. Schuette, manager, Public Relations Dept., NFPA, 60 Batterymarch St., Boston 10, Mass.

May 20-21, Louisville, Ky.
Kentuckiana Safety Conference and Exhibit, (Kentucky Hotel). Estel Hack, executive vice-president, Louisville Safety Council, 214 Speed Bldg., Louisville 2, Ky.

May 21-22, Oklahoma City
Tenth Annual Oklahoma Safety Conference (Skirvin Hotel). Bob Eastman, manager, Oklahoma Safety Council, 1600 N. W. 23rd St., Oklahoma City, Okla.

May 22-23, Duluth, Minn.
Thirty-fourth Annual Conference of the Lake Superior Mines Safety Council, (Hotel Duluth). Allen D. Look, secretary, 329 Federal Bldg., Duluth 2, Minn.

June 9-12, Cleveland, Ohio
Eighth National Materials Handling Exposition (Public Auditorium). Clapp & Poliak, Inc., Exposition Management, 341 Madison Ave., New York.

June 11-12, Bridgeport, Conn.
Thirteenth Annual Connecticut Safety Conference (Stratfield Hotel). A. V. Short, publicity director, 15 King St., Wallingford, Conn.

Sept. 16-18, Cleveland, Ohio
Twentieth Annual Ohio State Safety Conference (Pick-Carter Hotel). H.G.J. Hayes, secretary-treasurer, Ohio State Safety Council, 8 E. Chestnut St., Columbus 15, Ohio.

Sept. 18-19, Rockland, Maine
Thirty-first Annual Maine State Safety Conference (Samoset Hotel). Arthur F. Minchin, secretary, Department of Labor and Industry, State House, Augusta, Maine.

Oct. 20-24, Chicago
Forty-sixth National Safety Congress and Exposition (Conrad Hilton Hotel). R. L. Forney, secretary, National Safety Council, 425 N. Michigan Ave., Chicago 11.

Nov. 3-6, 1958, Philadelphia
Third National Industrial and Building Sanitation Maintenance Show (Convention Hall). Leonard S. Rogers, Orkin Expositions Management, 19 West 44th St., New York 36.

Nov. 30-Dec. 5, New York
American Society of Mechanical Engineers, Annual Meeting. (Statler and Sheraton-McAlpin Hotels). ASME, 29 West 39th St., New York 18.

Look Better SAFELY... with the NEW KIMBALL Better Looking Safety Spectacle

Designed for more attractive appearance while retaining the maximum degree of protection the new KIMBALL safety spectacle with strong butyrate frame offers lightweight, comfortable eye protection from most industrial hazards. The improved lens shape makes the new KIMBALL spectacles complement normal facial contour. Available with plain or prescription ground lenses. The sturdy frame will withstand rough industrial usage and the moulded plastic trim retains proper curvature permanently.

Available in lens sizes of 44, 46 and 48 MM.
Nose bridges come in 18, 20, 22, 24 and 26MM widths.
The KIMBALL catalog No. is: MA-1-A
One more KIMBALL development for YOUR safety.

OTHER KIMBALL SAFETY PRODUCTS . . .

EYE PROTECTION: Spectacle Goggles, Welding Goggles, Composition Goggles, Sideshields.

HAND PROTECTION: GLOVES: Welder's, Asbestos, Steel Stitched. MITTENS: Welder's Asbestos, Steel Stitched.

BODY PROTECTION: CLOTHING: Wool, Flameproofed Cotton. LEGGINS and SPATS: Leather, Asbestos, Flameproofed Cotton. APRONS: Leather, Asbestos, Flameproofed Cotton.

Kimball SAFETY PRODUCTS COMPANY
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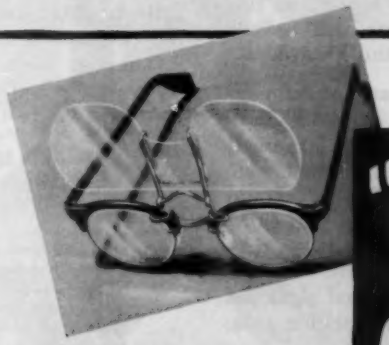
"SIDE SITE"

SIDE SHIELDS

These new, easily attached KIMBALL side shields meet eye protection standards, weigh practically nothing, can be readily replaced and cost very little. A trial will convince the most skeptical workman.

Made in clear and green transparent.
Ask for circular showing all types.



"KIM CLIP"

THE HANDY WAY TO GLARE PROOF PROTECTION

KIM-CLIP is a simply designed spring clip which holds melter's spectacles or plastic protective shields for welding and grinding operations. KIM-CLIP fits all types and makes of spectacles and can be attached in seconds. Adjustable to three definite positions: Up, OUT or Down. Extremely light weight and inexpensive too.

Circle Item No. 84—Reader Service Card

Design for Safety

—*From page 18*

possible, then added precautions should be taken to prevent collisions.

Sharp turns, grades, blind spots, intersections, crossovers, and congested points are hazardous.

Entrance and exit gates should be not less than 35 ft. from property line structures that might obscure vision. Gates for vehicular traffic should be arranged so that drivers leaving the premises have a clear view of cross traffic.

Passenger loading and unloading facilities should be arranged to avoid traffic hazards and reduce time and effort required to reach the plant. A plant on a main highway should provide space where buses can load and unload off the road.

Shelters for employees using public conveyances should be considered.

Some companies allow buses to run into the plant. They go down a ramp to a central location; employees reach their jobs through passages below the main production floor.

Where traffic is heavy, an underpass or overpass will reduce congestion, delay and hazard.

Parking. The parking lot cannot be overlooked in plans. If to reach it a busy thoroughfare must be crossed, an underpass or bridge may be needed. The lot should have separate entrances and exits.

Lighting at night helps to prevent accidents and theft.

Traffic and directional signs aid in proper use of the parking area.

Employee circulation. Efficient circulation of employees from parking lot to time clocks, from time clocks to lockers, and from lockers to work areas is considered by engineers.

Controlled conditions. Modern lighting and air conditioning have made man independent of nature for light and climate. Whether to build a windowless plant or one of conventional design is primarily a problem of economics, though some employees complain of a hemmed-in feeling, and in case of fire, walls must often be broken down to fight the blaze. Safe, healthful and comfortable working conditions can be provided in either type building.

The movement of industry from congested central locations to the suburbs where property values are lower has encouraged the construction of one-story plants. In many cases it has been possible to concentrate previously scattered operations under one roof.

Advantages claimed for one-story construction are:

1. Lower construction costs.
2. Freedom from stairs and elevators.
3. Ease in routing and handling heavy and bulky equipment.
4. Better lighting and ventilation.
5. Easier isolation of hazardous operations.
6. Efficient handling of material.
7. Ease of supervision.
8. Lower operating and maintenance costs.
9. Possibilities for pleasing architecture and landscaping.

Roofs. Flat roofs or those with few projections are comparatively low in cost. Monitor and sawtooth roofs are effective in admitting light and air to the center of the building, but are more expensive to build. Modern light sources rivaling natural light make daylight less important.

HAZARD SPOT CARD
For Job Planning and Instruction

WORK AREA
Footing: uneven ☐ obstructed ☐ slippery ☐
Cramped quarters ☐
Exposure to traffic ☐
Insecure piles or overhead material ☐
Inadequate illumination ☐ glare ☐
Temperature: too hot ☐ too cold ☐
Exposure to gases ☐ dust ☐ fumes ☐
Hazards from nearby operations ☐

MACHINERY
Point of operation: cutting ☐ shearing ☐
punching ☐ abrading ☐ flying material ☐
Power transmission: shafts ☐ belts ☐
gears ☐ pulleys ☐ electrical conductors ☐
Unsafe starting and stopping mechanisms ☐

TOOLS
Wrong tool for the job ☐
Tool in unsafe condition ☐
Tool placed in unsafe position ☐

HANDLING MATERIAL
Material or objects: heavy ☐ unwieldy ☐
rough ☐ sharp ☐ hot ☐ corrosive ☐
Unsafe handling equipment: trucks ☐
conveyors ☐ hoists ☐ containers ☐

SAFETY Instruction Card No. 775

Materials Handling

Materials are moved in and out of the plant by highway, railroad, water, and sometimes, by air. More than two of these methods seldom are needed.

Loading docks should be planned for traffic both outside and within the plant.

Studies of the flow of materials through a plant—from their receipt, through processing, until they are shipped out as finished products—often reveal ways to reduce handling operations as well as hazards.

Adequate clearances between vehicles and fixed structures must be provided. This is particularly important in plant railways and driveways.

Waste material must be removed constantly. Junk accumulates when efficient removal facilities aren't provided.

Machine Layout

The work station. Insufficient space is a common cause of accidents. Each operator should be able to sit at, stand at, and move safely about his machine, bench, desk or other equipment.

He must be able to get into that space without slipping, bumping objects, striking overhead objects, or coming into contact with live electrical parts or moving parts of machinery.

He must have room to move material being processed. He must have space for hoists, lifts, or hand or power trucks.

In continuous-line operation where machines are served by conveyors, little or no intermediate storage space for materials is necessary. In other types of operation, added space for storage of raw and finished materials is essential.

Insufficient headroom is a hazard. "Temporary" installations of pipelines, equipment supports, overhead conveyors, and other installations that might cause head bumps often can be avoided. Elevation drawings should be studied to determine location of poten-

—*To page 124*

DUPOR No. 4

For nuisance dusts and fumes. Weighs only 4 oz.

$2.00

DUPOR No. 40

U.S.B. of M. Approved. Has 40 sq. in. filters for Pneumoconiosis producing and nuisance dusts.

$3.00

DUPOR No. 46

U.S.B. of M. Approved for Pneumoconiosis producing and Lead dusts.

$3.25

DUPOR No. 1

Miniature nose mask for nuisance dusts and fumes.

$1.20

DUPOR No. 24

U.S.B. of M. Approved. Has 24 sq. in. filters for Pneumoconiosis producing and nuisance dusts.

$3.00

Wear a Genuine

DUPOR

REG. U. S. PATENT OFF.

Respirator

light weight · greater visibility · no blind spots
face cloth for personal sanitation · panorama view
controlled breathing · exclusive patented features

H. S. COVER
South Bend, Indiana

DUPOR No. 10

Chemical cartridges. For organic and inorganic gases.

$5.00

DUPOR No. 20

Double sponge, for cool, water-washed breathing.

$2.50

DUPOR Automatic

With sponge filter for water-cooled

$2.25

DUPOR Smoke Mask

Equipped with "Nod & Shake" fog-proof, gas-tight goggles.

$5.00

COVER'S "Nod & Shake" GOGGLES

Gas-tight, fog-proof. Wear with any respirator.

$2.00

Circle Item No. 85—Reader Service Card

tially troublesome equipment.

Vertical clearance of at least 7 ft. should be provided, especially over aisles, passageways, and stairways. Where this is not practicable, overhead obstructions should be padded or marked by contrasting paint.

Storage space must be adequate to avoid confusion, bad housekeeping, fire hazards, overloaded floors, and damaged stock.

Supplies, tools, safety equipment, small parts, and equipment not used regularly should be stored in convenient locations.

Maintenance is facilitated when such items as personal protective equipment, ladders, and hoisting equipment are readily available.

Safe access to all parts of the plant should be provided.

Stairways are first choice where conditions permit.

Fixed ladders may be used where space is limited.

Portable ladders are acceptable where need for access is relatively infrequent.

Stairs for general use should be convenient to areas served, have standard handrails and be free from obstructions at top or bottom.

In-plant Traffic

Planning for the movement of power trucks, hand trucks, and tractors in and about buildings requires provision for adequate clearance in aisles, corridors, and passageways, and at corners and curves.

Aisles, particularly main traffic aisles, should be of generous width, straight as possible and free from obstructions. Where possible, corners should be cut off on a diagonal and visibility unobscured.

If vehicles must pass, the aisle should be at least twice the width of the widest part of the vehicle or load, plus another 3 ft. if the aisle is used by pedestrians.

If traffic is not heavy, the aisle can be of a width equal to the maximum width of the vehicle or load plus 2 ft., provided passing zones are established at intervals of from 150-200 ft. One-way traffic aisles are becoming increasingly popular.

Aisles should be marked by colored lines—safety orange or white. Permanent markers, such as metal disks, also are suitable. Floors should be kept clean and defect-free.

Aisles should be well lighted. If not lighted at night by general lighting, night lights should be provided for the benefit of service employees or off-shift workers. Emergency passageways should be marked by standard exit markers.

Cross aisles should be avoided at tops and bottoms of ramps. If possible, aisle and ramps should be in a straight line.

Pedestrian traffic. Aisles should be proportionately wider to accommodate rush traffic to time clocks, lunchrooms and exit gates. Main aisles up to 20 ft. wide and

—*To page 126*

Low cost hairgards add fashion to safety

Fashion designed StaSafe Hairgards, in a wide variety of flattering colors, are tailored to today's women. Modern styling of mesh Hairgards match good looks with safety. Solid cap styles are popular for protection against dust, oil mist and possible scalp infection. Snood models, in either mesh or solid material, are designed for long hair styles.

Hairgards are also available with your slogan or emblem printed in one contrasting color. Helps make your safety program a morale builder. Strengthens pride in department, work, company and safety record.

Hairgards bring stylish fashion along with better safety into your plant.

Write today for your free copy of the HAIRGARD BROCHURE.

STANDARD SAFETY EQUIPMENT COMPANY
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LOS ANGELES 66, CAL. 12921 W. Washington Bl.

Circle Item No. 86—Reader Service Card

Circle Item No. 87—Reader Service Card

Dockson HELMETS

COMFORTABLE

STURDILY BUILT

EASILY ADJUSTABLE

DESIGNED FOR SAFETY

ONE PIECE CONSTRUCTION

NO TROUBLESOME RIVETS

HIGH VALUE FOR LOW DOLLAR

Model M-1250

Dockson Helmets are honestly "Built for better service." They incorporate all the outstanding comfort and safety features which have made Dockson an important name in safety equipment.

Quality built, light, rugged, fully adjustable. Fitted with Federal specification plates of your choice. Headgear designed for comfort and long service.

You'll get more for your money with Dockson Better Built Equipment.

Write for complete Safety Equipment Catalog.

Model 1250-80

Model 1750

Model 1225

Model 1450

Dockson CORPORATION

3839 WABASH AVE. • DETROIT 8, MICH.

cross aisles not less than 8 ft. wide are desirable.

Where foot traffic parallels railways or other fixed traffic carriers, adequate clearance should be provided to allow the aisle edge to be marked by a conspicuous line on the floor.

Gates, warning signals or signs and barricades should be provided. Where traffic is heavy underpasses or bridges for both vehicular and pedestrian traffic should be considered . . .

Keep Up Appearances

Appearance of the plant—both inside and out—is important. Employee and community relations are helped by the looks of a factory, and customers often judge the product by the plant. The housekeeping program should include the entire property.

Landscaping should be planned for economical maintenance. With power mowers and sweepers, a small force can take care of a large lawn if it is not broken up by shrubbery and flower beds. Trees are an asset to both company and community.

Decorative floodlighting is employed by many companies with distinctive buildings and well-kept grounds.

Floors

—*From page 25*

price and are used principally for patching and for resurfacing limited areas.

Ceramic tile is frequently used where oils, acids, or alkalis are present and in food product plants where floors must be washed frequently.

Asphalt tile is suitable for offices, stores, light manufacturing areas, and floors below grade. Several grades are available: industrial, standard, greaseproof, conductive, and greaseproof-conductive. It is moisture resistant but susceptible to indentation. It should be laid over a rigid base.

Asphalt tile is lower in price than other resilient flooring materials. It is non-slippery in its normal state and can be kept in good condition with non-slip floor finishes. Solvent waxes will cause deterioration.

Linoleum is quiet and comfortable underfoot. It is used in offices, laboratories, and workrooms where cleanliness and appearance are important. Heavy gauge linoleum will withstand loads up to 75 psi. without permanent marking. Since highly polished linoleum is extremely slippery, the choice of a finish is important.

Rubber is resilient and durable when not exposed to oils and solvents. It has high dielectric strength which is undesirable where static electricity is a problem. Conductive types of rubber flooring are suitable for such locations. Abrasive rubber flooring is useful for stair treads, elevator sills, and thresholds.

Vinyl plastic, usually in tile form, is durable and decorative but relatively high in price. It

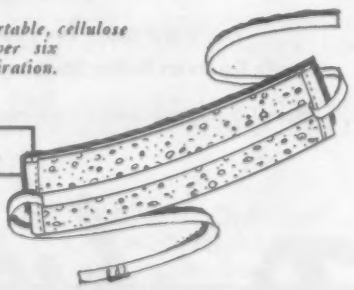
16c INVESTMENT* CUTS LABOR COSTS

Here's proof that StaSafe Koolpads, mopping up perspiration, cut labor costs:

Take one man wearing glasses or goggles during the hot summer months. He frequently stops work to, 1) take out his handkerchief, 2) take off his glasses, 3) mop his forehead, 4) wipe his glasses, 5) replace his glasses, 6) replace his handkerchief, and finally 7) return to work. At today's wage scale, you pay a high penalty in lost labor and a higher penalty in lost production.

On a hot day, the number of "perspiration stops" prevented more than pays for the 16c investment of a Koolpad. You save labor, gain production and pay for the Koolpad. And even more important, *that same* Koolpad goes on to save you money day after day because StaSafe Koolpads are rinsed in seconds and used over and over again! It pays to look into Koolpads. They are the biggest "little" investment you can make.

Koolpads are lightweight, comfortable, cellulose sponge headbands absorbing over six times their own weight in perspiration.



* 14c in quantities of 1000 or more.

Write in today on your letterhead for a **FREE SAMPLE KOOLPAD.**

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JACKSON for SAFETY

Many New Quality Products Added to Jackson Line

Arc Welding Helmets of fiber glass far outlast helmets of vulcanized fiber. Helmet shells in curved (above), narrow (at right), and straight styles have adjustable helmet stops. Adjust-O-Lok headgear of strong, non-conductive Nylon and Nylon friction pivots are instantly adjustable while being worn. Plastic insulated lens holders are made in fixed and lift-front types. All helmets and Musketeer face shields combine with both Jackson safety caps.

'Life Guard' all-plastic safety hats surpass Edison Institute requirements, and Federal Specifications for construction workers as well. A hat and a cap, in white, yellow and grey.

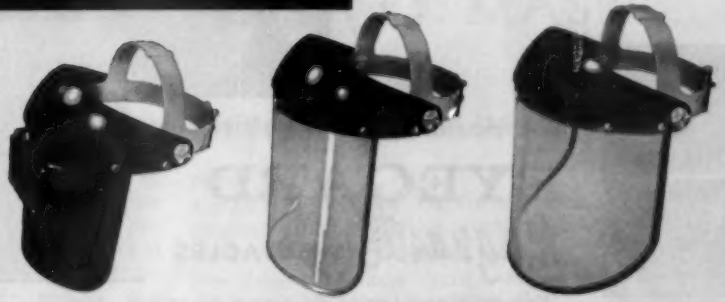
Supergoggles provide good fit and free movement over the largest prescription and safety spectacles. In two types: for gas welding and for grinding, available with plastic headrest, or with elastic headband as shown.

Fiber Glass safety hats exceed Federal Specifications for construction workers' hats. Both hats and caps are made in eight standard colors. Chin straps and 'Winterizers' are optional.

The 'Musketeer' (one-for-all) headgear combines the Adjust-O-Lok helmet headgear, friction pivots and adjustable stop, with a wide spark deflector in one durable, convenient unit. Shown above with 15½" by 9" visor in clear plastic and in shades of green.

Unigoggles for gas welding, as well as Supergoggles, are available combined with both Jackson safety caps.

'Aluminat' safety hats of aluminum comply with all construction workers' requirements except electrical insulation. Headgears on all Jackson hats are durable, comfortable, easy to adjust.



Left to right . . . Musketeer with fiber visor and welding lens in plastic lens holder . . . Musketeer with one of the metalbound plastic visors, 11⅛" wide in depths of 4", 6", 8", as used on the well known type J-1 eyeshield, and . . . Musketeer with 24-mesh wire screen visor, 15½" by 9".

Sold World-Wide through Distributors and Dealers of Welding Supplies and Safety Equipment

JACKSON PRODUCTS

AIR REDUCTION SALES COMPANY, A DIVISION OF AIR REDUCTION COMPANY, INCORPORATED

WARREN • MICHIGAN

Circle Item No. 89—Reader Service Card

Circle Item No. 90—Reader Service Card

No Time Wasted!

WHEN WORKERS WEAR

STASAFE

WINDSOCKS

The Safety Hat Liners
That Need No Installation

9" length $2.64 doz.

11" length $3.00 doz.

Windsock is an inexpensive knit cap that's warm, lightweight and snug. It actually costs less than the *time alone* spent by a worker in installing or removing a permanent type liner. Buy a dozen and test them. See for yourself how Windsocks put an end to those chilly drafts that whistle between the safety hat shell and your head.

Write for Descriptive Bulletin No. 52

STANDARD SAFETY EQUIPMENT COMPANY
232 West Ontario Street, Chicago 10, Illinois

FOR PROTECTION

HELMETS

SPECIALTY GOGGLES

and maximum working efficiency

FACE SHIELDS

SPECTACLES

WELDING GOGGLES

LENSES & PLATES

EYEGARD
Magnasite SPECTACLES

High-style spectacles with new S7 square shape lenses provide larger viewing area. Handsome, modern, clear crystal plastic frame with spatula temples. Light-weight, sturdy, comfortable, impact resistant. Furnished with 6-base curve, clear and green hardened lenses, or new optically perfect Amerilite lenses, clear and green. Four eye sizes, four bridge sizes. With Magnasite you get the best—yet you'll save money!

Write for Catalog of Complete Line.

AMERICAN INDUSTRIAL SAFETY EQUIPMENT COMPANY
3501 LAKESIDE AVENUE CLEVELAND 14, OHIO
Division of The Burdett Oxygen Company, Cleveland, Ohio

Circle Item No. 91—Reader Service Card

resists acids, alkalis, and most organic solvents. The surface is nonporous and easy to keep clean.

Wood block is widely used for heavy duty general purpose floors. A floor of this type is durable, relatively quiet and comfortable under foot and does not become slippery. Blocks laid on a smooth, rigid base will stand up under heavy trucking and are not likely to crack. Blocks impregnated with creosote resist dampness.

Blocks should be set in high-melting-point pitch. Ordinary pitch or tar filler may stick to wheels and shoes in hot weather.

Wood plank. Hard, close-grained wood provides a floor that is comfortable and reasonably durable under foot traffic. Under moist conditions, boards may swell and buckle. A heavy subfloor makes the surface flooring more resistant to moisture and traffic. Under heavy wheel traffic, boards may loosen or break frequently, causing hazardous conditions and excessive maintenance. A penetrating floor seal protects the surface and makes cleaning easier.

Fabric surfacing. Heavy fabric coated with mineral grains is used indoors and out for stair treads, ramps, and around machines. The material can be applied to concrete, metal, or wood. It is backed with adhesive to the surface under pressure. It wears well and resists water, oil, and weather.

Steel plates are serviceable for platforms, stair treads, floors, hatchways. They wear well and are easily cleaned but are noisy and highly conductive of heat.

Extruded patterns offer good traction and resistance to slipping. When worn, plates can be roughened with a welding torch.

Steel plates are also used over ducts which carry electric circuits or pipe lines. They are easily assembled and can be removed for servicing equipment.

Magnesite is suitable for light traffic. It must be laid on a rigid base. It should not be used where there is excessive moisture or hydrostatic pressure, as in basements. It is resistant to oil. A coat of bituminous paint should

protect metal surfaces in contact with magnesite since it corrodes some metals.

Terrazzo floors are durable and easily maintained. Abrasive aggregates in the mixture provide a non-slip surface. Sealers make it impervious to most acids. Where there is excessive foot traffic, as in building lobbies, rubber mats reduce slipping hazards and protect the surface.

Lead is used for floors exposed to acids and as insets or mats for secure footing in operation of woodworking machines or other places where the results of a slip and fall would be unusually serious. Lead is conductive of heat, nonsparking and quiet.

Zinc is non-sparking and sometimes used in such locations as compounding rooms where fire and explosion hazards exist. Zinc is not resistant to acids and alkali. * * *

OIL ABSORBENT applied promptly after a spill keeps floors clean and prevents slipping and fire hazards.

Care of Floors

Floors of all types last longer if properly cared for. A protective coating is usually desirable.

Hardwood flooring in its natural state dries out and cracks and splinters under traffic. Scrubbing raises the grain of the wood and excessive moisture causes it to swell and warp. For protective coatings, sealers, enamels, and varnish are used. Sealers penetrate the wood and produce a durable finish.

Concrete resists moisture but has a tendency to dust under traffic. This can be checked by treating with a sealer. If color is desired, a penetrating dye or a floor enamel may be used.

Linoleum, vinyl, asphalt tile, and rubber tile are impervious and decorative. Care consists of cleaning and preserving the surface. As little water as possible should be used in cleaning.

Wax protects the surface and preserves appearance. It makes regular maintenance easier by keeping dirt from being ground into the floor.

Water emulsion (self-polishing) wax can be used safely on all types of floors. Buffing waxes contain solvents which injure asphalt and rubber. Either type may be used on vinyl floors.

Self-polishing waxes are considerably less slippery than buffing waxes. Tests have been made

New **ACME**

Full Vision
"SPEC"
MASK

At Last... **GAS MASK PROTECTION FOR EYE GLASS WEARERS**

If you wear eye glasses, you no longer have to put up with the hazard of ill-fitting gas masks worn over your regular spectacles. This exclusive new Acme "Spec" mask now gives you a facepiece with all the proved Acme safety features PLUS built-in eye glasses ground to your individual prescription.

You can get the Acme "Spec" mask complete with personal lenses by sending your doctor's prescription with your order. Or, if you prefer, the mask can be furnished with stirrup, bracket and front ready for your doctor to mount your proper lenses.

Either way, you get the perfect vision, safety and comfort along with the Acme advantage of one facepiece serving multiple uses.

For details on this timely Acme development, write for Bulletins No. 576 and No. 576-A (Prescription Form).

FREE PROTECTION GUIDE

Lists 433 hazardous gases, mists, fumes, and dusts . . . along with Acme protection recommended to overcome them. Write for Bulletin 542.

ACME PROTECTION EQUIPMENT CO. 1209 Kalamazoo St., South Haven, Mich.

Circle Item No. 92—Reader Service Card

INDUSTRIAL BREATHING HAZARDS MADE SAFE

Bureau of Mines Approval No. 1308

THE MAN WITH THE SCOTT AIR-PAK BREATHES PURE FRESH COOL AIR AT THE LOWEST OPERATING COST*

Operating a sand mill in a foundry.

Worker with Scott Air-Pak cleaning a degreaser.

In temperatures from 20° below to oven heat the Scott Air-Pak delivers cool, pure, fresh air comfortably, to meet the full needs of the wearer, regardless of the degree of exertion. Breathing is completely independent of surrounding atmospheres. The Scott Air-Pak is always ready. Takes only seconds to go into action. Ideal for industrial routine or emergency operations.

The new Scottoramic Mask gives vision unlimited — wide angle vision in all directions that helps the wearer to spot danger zones quickly for maximum safety.

*Scott Air-Paks can be refilled at a surprisingly low cost. Repair and maintenance costs are lower than other types of self-contained breathing protection equipment.

On hazardous jobs, Scott Air-Paks help management and labor breathe easier. Send for the Booklet "Scott Air-Paks Save Money, Man Hours and Men for Industry". Write direct or ask your nearest Scott Distributor.

SINCE 1932 Scott FOR SAFETY—FOR SERVICE

SAFETY EQUIPMENT DIVISION

SCOTT AVIATION CORP.

211 ERIE STREET LANCASTER, N. Y.

Canada: Safety Supply Co., Toronto — Branches in principal cities

Export: Southern Oxygen Co., 250 West 57th Street, New York 19, New York

Circle Item No. 93—Reader Service Card

to determine the frictional resistance of various floor finishes on different types of floors. However, it has not been found possible to give any finish a rating which would apply for all surfaces and all conditions.

Floor cleaners should not leave a slippery film. Soap is permissible for such surfaces as concrete, common brick, wood block, and mastic. For marble and smooth tile a cleaning powder that does not leave a slippery residue should be used.

Strong alkalis and coarse abrasives are injurious to many types of floors, and usually milder cleaners will be effective.

Floor coating and finishing materials are listed by Underwriters' Laboratories (Accident Equipment List) in three classes. Materials listed have been found to have slip-resistance characteristics of not less than 0.5 as determined by the static friction test method of U.L.

I. Floor Treatment Materials (FTM)

1. Water-base materials.
2. Fillers, sealers, varnishes, and similar materials.
3. Detergents.
4. Abrasive-grit-bearing liquids.
5. Waxes, other than water base.
6. Sweeping compounds.

(The Gas and Oil Equipment List lists materials according to fire hazard classification.)

II. Oil and Grease Absorbents (OGA)

III. Walkway Construction Materials (WCM). Includes floor plates and stair treads made of:

1. Natural stone.
2. Composition.
3. Abrasive-grit-surfaced materials.

Oil Absorbents

Around machines and other areas where oil and grease accumulate, hazardous and unsightly conditions develop. Oil spills should be cleaned up promptly. Non-combustible absorbents keep floors cleaner and reduce slipping and fire hazards.

Absorbents are of two types—one for oils and greases; the other an all-purpose absorbent where water and other liquids are also present. They have a much greater absorbing capacity than sawdust, waste or rags, are non-combustible, and less bulky.

Absorbents are not subject to spontaneous heating unless the absorbed oil has that characteristic.

Oil-soaked garments, shoes, ropes, and belts can be dry cleaned by burying in the compound.

Sweeping compounds keep down the dust from dry sweeping. These are listed by Underwriters' Laboratories (Gas and Oil Equipment List) in two groups: Class I, noncombustible; Class II, slow-burning. Tests include combustibility, behavior on heating, and spontaneous heating characteristics. * * *

Color

—From page 32

spicuously at valves, pumps and similar places.

Color stripes painted at the edges of the color bands also may be used to identify the exact contents of lines, but this is less satisfactory than stenciled identifications. Labels which conform in color and size of letter to the code, are on the market.

Industrial Finishes

Paints, enamels and lacquers provide a practical and flexible medium for the application of color. Industrial finishes often are subject to severe exposures; many types of paint have been developed for special needs.

Acids and alkalis cause some paints to change color. Paints resistant to moisture and chemical action should be used.

Floor coatings. Synthetic enamels and rubber base floor coatings give better service on concrete than ordinary floor enamels and are more resistant to moisture, acids, and alkalis.

Light-colored floors conserve light. They may be stippled with darker colors to avoid glaring contrasts.

A painted concrete floor often seems more resilient underfoot than bare concrete. The thin film of paint may help physically but the psychological effect is probably more important.

Water-thinned paints. Cold water paints (synthetic resin and

liquid tight StaSafe Self-Ventilating hood features "breather tunnel" to keep chemicals out, let air in.

In this photo, look just below the acetate window and you'll see why the Self-Ventilating hood never needs an air line (where ambient air is safe to breathe). The channel you see there is the exclusive "breather tunnel." Notice how it slopes downward and how liquids run over the top of it. Through this tunnel the wearer continuously breathes clean, cool, fresh outside air *regardless of the liquid hazard.* This unlimited supply of air ventilates the hood and keeps the large acetate window fog-free.

- highly chemically inert Gra-Lite fabric
- armored seams prevent seepage
- large, easily replaceable .040" acetate window
- fiberglass frame and plastic headgear prevents warpage from moisture
- lightweight

Write today for your copy of the bulletin on the STASAFE SD3786 SELF-VENTILATING HOOD, showing details of construction, range of protection and possible uses.

See this hood in booth no. 35 at the National Safety Congress.

STANDARD SAFETY EQUIPMENT CO.
232 WEST ONTARIO STREET • CHICAGO 10, ILLINOIS

597 BROADWAY, NEWARK 4, N.J. | 12921 W. WASHINGTON BLVD., LOS ANGELES 66, CALIF. | 855 EAST 152nd STREET, CLEVELAND 10, OHIO

THE KENNEDY **"VICTORY"** CAP
designed for *GREATER SAFETY*
for all industrial Jobs!

Better protection for all the hair all the time because the full, wide, snood-type back of the Kennedy "Victory" Cap permits complete coverage. Easy to put on. Adjustable to all head sizes. 11 styles to choose from.

Manufacturers and distributors of a complete line of safety clothing and equipment.

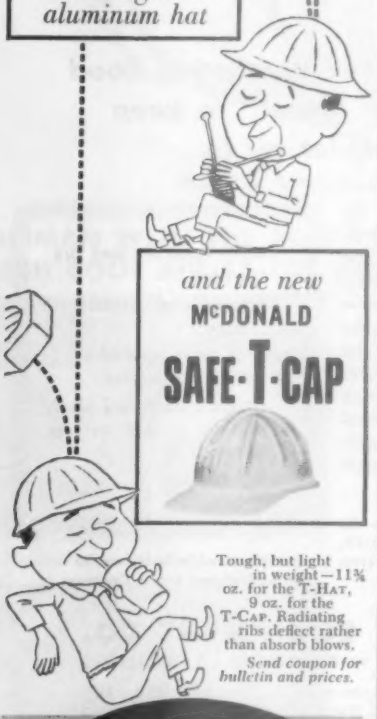
Write Dept. N-3 for information regarding your needs.

K-I **KENNEDY-INGALLS, INC.**
3735 NORTH 35TH ST., MILWAUKEE 16, WISCONSIN

McDONALD PRODUCTS
Safety Designed...
with comfort in mind!

famous
McDONALD
SAFE-T-HAT
the original aluminum hat

and the new
McDONALD
SAFE-T-CAP



Tough, but light in weight—11¾ oz. for the T-Hat, 9 oz. for the T-Cap. Radiating ribs deflect rather than absorb blows.
Send coupon for bulletin and prices.

B-F-McDonald Co.
Safety FROM HEAD TO FOOT
Manufacturers & Distributors of Industrial Safety Equipment

5721 W. 96th St., Los Angeles 45, Calif.
3745 Greenbrier Dr., Houston 6

Please send information and prices on SAFE-T-HAT AND SAFE-T-CAP.
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FIRM
ADDRESS
CITY STATE

Circle Item No. 96—Reader Service Card

rubber base types) are satisfactory for some industrial interiors. They can be applied with spray-coating equipment, and are washable and serviceable where not exposed to weather and dampness.

Rubber base paints are more durable and will stand considerable washing.

Luminescent Materials

Some types of paint, tape, and plastics become luminous in complete darkness after exposure to natural or artificial light.

Fluorescent materials glow only while exposed to ultraviolet light. There is no usable afterglow. They are used where desirable for the eyes to adapt to darkness, as in instrument dials, night flying and driving, and where electric power is available for producing light. They enable the operator to observe readings without glare or eye fatigue.

Phosphorescent materials glow after exposure to light and remain luminous after the light is extinguished. They are observed best under total or near-total darkness. The glow is of low intensity, suitable only for close viewing in darkness.

Reflecting coatings or buttons are effective for direction or warning where light from headlights, flashlights, cap lamps, and similar sources is available.

Rust prevention. Paints which form a tight bond with clean metal offer protection against rust and corrosion. Where rust has started, ordinary paint is ineffective because corrosion continues under the paint film. Rust-sealing coatings, both clear and pigmented, often are helpful. * * *

After Work In Corrosive Atmospheres

When personal protective equipment is worn in a corrosive atmosphere, set up a rigid procedure for care of it after use to prevent contact with contaminated parts.

Before removal, even though it has not come in contact with corrosive chemicals, wash equipment thoroughly with a hose stream.

Remove boots, coats, aprons, and hats—then gloves. This is the logical order of removal if the coat has been put on properly with the sleeves outside the cuffs of the gloves.

Wash hands thoroughly before removing face shield and goggles. Then wash hands and face thoroughly again. A shower and change of clothing are better.

Germicidal Lamps Need Special Fixtures

Germicidal lamps, to be efficient and safe, must be used in fixtures designed for them. The wrapper on each lamp warns the purchaser not to look, or even glance, at the lighted lamp.

When germicidal lamps are erroneously bought for general lighting, used in improperly designed fixtures, or installed incorrectly, they will not function effectively and the invisible ultraviolet energy generated by them can be harmful.

For Safety
Guardi-Ann Hat
U.S. PATENT NO. 2,827,636

Combines utmost protection and style. Exclusive patented features found in no other hat.
Write for Free Sample or Order Direct from us
$15.00 dz.
CHIC MAID HAT MFG. CO., Inc.
630 HIGH STREET
BUFFALO 11, N. Y.

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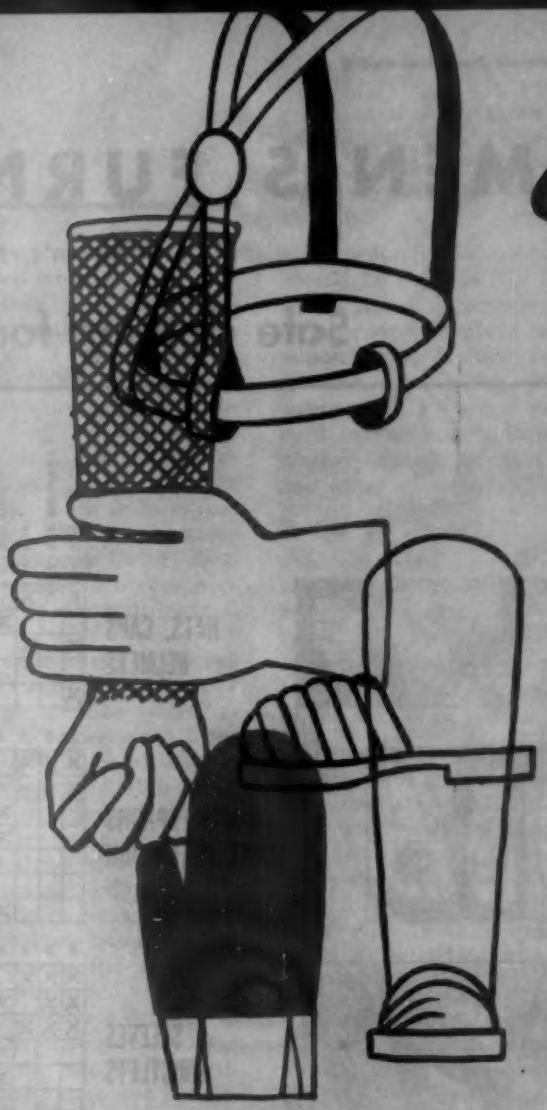
IN SECTION 6:

Men's Furnishings 134
Foot Protection 135
Protective Clothing 146
Hands and Arms 150
Leg Protection 152
Safety Belts and Harnesses . 154



6

PARTS of the body below the neck are frequently injured. They account for a large proportion of the compensation paid.

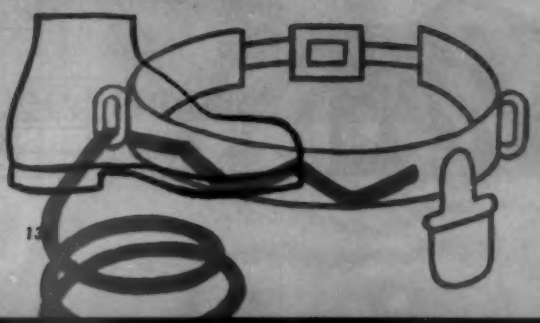
A study of accident statistics over the past few years reveals some significant facts. Those parts of the body for which protection is widely used account for low percentages of both disability cases and total compensation paid.

For example, toes account for an extremely low percentage of both cases and compensation—4 per cent and 2 per cent respectively.

Fingers, on the other hand, get into more danger and can't be shielded in rigid armor like toes. They are involved in 16 per cent of the injuries and 13 per cent of the compensation.

The reason? Safety shoes. But even parts of the body which can't wear rigid protection can be shielded against many cuts, abrasions, and skin infections by protective garments.

PERSONAL PROTECTION PART II



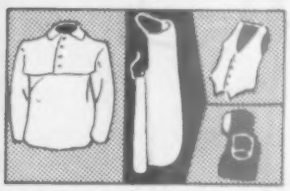
MEN'S FURNISHINGS

(Women's, too)

Safe clothing for every job

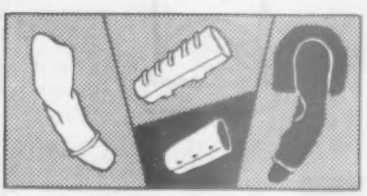
HATS, CAPS HELMETS

Sparks 1	Hot Materials 2	Heat 3	Hot Liquids 4	Moisture 5	Acids & Alkalis 6	Slips & Falls 7	Falling Objects 8	Flying Particles 9	Electric Shock 10	Cuts & Abrasions 11	Dermatitis 12	Explosives 13	Machinery 14	
X	X	X												Asbestos
			X	X	X				X		X			Plastic-Rubber
X		X									X		X	Cotton-Wool
							X	X		X				Metal
X							X	X	X	X				Plastic



COATS, APRONS WAIST PROTECTION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	
X	X	X												Asbestos
X	X		X					X		X				Chrome Leather
			X	X	X				X		X		X	Plastic
			X	X	X				X		X		X	Rubber
								X		X			X	Canvas-Fiber
					X									Chemical Resistant
			X											Reflective Fabric

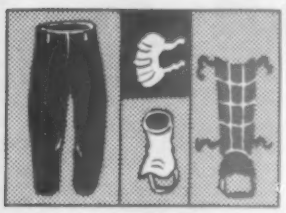


SLEEVES WRISTLETS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	
X	X	X												Asbestos
X	X		X					X		X				Chrome Leather
X	X	X						X					X	Flameproofed Duck
			X	X	X						X			Plastic
			X	X	X				X		X			Rubber
					X									Chemical Resistant
			X											Reflective Fabric

GLOVES, MITTENS HAND PADS FINGER GUARDS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	
X	X	X												Asbestos
X	X		X					X		X				Chrome Leather
			X	X	X				X		X			Rubber
			X	X	X						X			Plastic-Rubber Coated Fabric
										X				Metal Mesh
										X				Cotton-Canvas



PANTS, KNEE PADS LEGGINGS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	
X	X	X												Asbestos
X	X		X					X		X				Chrome Leather
X	X	X						X					X	Flameproofed Duck
X							X	X		X			X	Fiber-Metal
			X	X	X						X			Plastic
			X	X	X				X		X			Rubber
					X									Chemical Resistant
			X											Reflective Fabric

SHOES, BOOTS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	
							X			X			X	Steel Toe Caps
				X		X								Non-Skid Shoes
	X	X	X	X	X	X	X			X				Wooden Soles
X	X	X	X	X										Chrome Leather
			X	X	X				X		X			Rubber
												X		Conductive Rubber

Foot Protection

SAFETY SHOES for industrial use may be classified in five general categories according to construction and intended use:

1. Steel box toe (general use)
2. Conductive
3. Explosives operations (non-sparking)
4. Electrical hazard (shock-resisting)
5. Foundry

Special styles for women are provided in classes 1, 2 and 3.

As generally used, the term "safety shoe" means a shoe with a reinforced toe. Steel toe boxes are specified for most occupations because of their ability to resist heavy blows.

Around electrical equipment, where impact resistance must be compromised with the need for insulation, toe boxes of fiber or plastic are used.

Standards

American War Standards, Z41 Series, American Standards Association, are still the accepted guide for purchasers of safety shoes.

Specifications call for a well-constructed, durable work shoe with a toe reinforced by a steel box. The box is supported on a flange resting on the sole. It must support a static load of 2,500 lbs. and resist the impact of a 50-lb. weight dropped one foot.

When subjected to either test, the inside of the toe box must not come closer than one-half inch from the upper surface of the sole.

Strength requirements for shoes for both men and women are identical.

Shoes meeting these requirements bear an identification stamp on one shoe of each pair. The stamp indicates the type of shoe according to the code classification.

Distribution

To secure acceptance of foot protection, safety shoes must be comfortable and properly fitted. Purchasing must also be made convenient.

Many large companies maintain well equipped stores with a wide range of lasts and sizes and trained attendants to fit the shoes. Shoes are sold at cost on the payroll deduction plan. Safety shoes are sometimes awarded as contest prizes.

Smaller plants are not always in a position to stock an adequate range of sizes or provide expert fitting service. Many companies make arrangements with local dealers whereby employees may purchase shoes through payroll deduction.

A mobile shoe service is offered by dealers in some areas. A truck equipped as a shoe store is manned by an experienced fitter who is responsible for all adjustments. A variety of styles and full range of sizes are carried. Periodic visits are arranged and between visits shoes can be obtained quickly on special order.

This service is rendered on a moderate mark-up basis and the plant can charge the employee any part of the cost.

It is desirable for a worker to have more than one pair of safety shoes so they can be rotated. Shoes will last longer and be easier on the feet. The wearer will also have a pair available while the other is being repaired.

Many companies encourage purchase of safety shoes for wear off the job. They know that the buyer's feet will be protected when the shoes end their days on the job.

Records for each employee should be kept. A 3 x 5 in. card shows name, department, payroll number, and details of each transaction. These include, date, stock number, size, width, price, and payment. The reverse side of the card carries such information as history, details of foot trouble, and other comments.

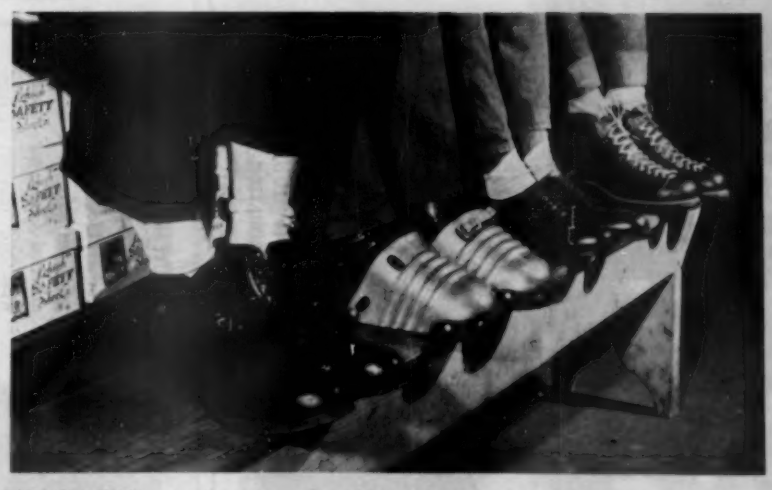
Types of Shoes

Safety shoes, generally, are well made on lasts designed for comfort. They are available in many types and styles, some suitable for street wear. The protective toecap does not add appreciably to the weight or cost of the shoe.

General purpose shoe. The most widely used type is the blucher, high cut oxford. It is available in a wide range of sizes, widths and lasts, ranging from rugged, heavy-duty styles to those suitable for street wear. It is the basic type, with certain differences in detail for special occupations.

Foundry shoes. An early type of safety shoe still in use is the foundry shoe with elastic panels at the sides. There is no opening on the instep where molten metal or hot sand can penetrate and the shoe can be pulled off quickly in

—*To page 140*



THREE TYPES of safety shoes for light or heavy duty. Foot guards are worn where extra heavy objects are handled. (Diamond Alkali Co.)

SAVE $$$...SAVE TOES!

order your safety shoes at wholesale cost from the

LEHIGH SAFETY SHOE STORE

Cut out these pages and post on your company bulletin board

TOP QUALITY!

1637 – Brown Pebble-Grain moccasin with piped edges, full leather lining, oak leather outsole, half Neoprene heel.

A, B-7-13
C, D, E, EE, EEE-5-13

HEAVY OILED OAK LEATHER

1618—Tan leather moccasin, oiled oak leather heavy single outersole, half Neoprene heel, combination last.

AA-5-13
A, B-6-13
C-5-15
D-5-14
E, EE, EEE-5-13

NEOPRENE NYLON CORD

1504—Brown moccasin, oil-resistant Neoprene-Nylon-cord sole and heel, Dacron stitched.

B-7-12
C, D, E, EE, EEE-5-13

GOODYEAR CHEMIGUM

1645 – Brown grained leather, Goodyear Chemigum outsole and heel, notched Goodyear storm welt.

B-7-13
C, D, E, EE-5-13

HEAVY OILED OAK LEATHER

1625 – Brown elk woven blucher, heavy oiled oak outersole, Neoprene heel, Nylon mesh lined vamp, zebra storm welt, combination last.

A, B-7-12
C, D, E, EE-5-13

NEOPRENE CREPE

1676 – Brown loafer, Neoprene crepe outsole and heel, elastic-gored saddle strap, Goodyear welt stitched all around.

B-7-12
C, D, E, EE-5-12

LEATHER SOLE

1611—Brown moccasin, leather sole, Neoprene heel, Dacron stitched.

AA-5-13
A, B-6-12
C, D, E, EE-5-13

EASY FITTING LAST

1519 – Brown Quilon-tanned, oil-resistant Neoprene-Nylon-cord non-marking sole and heel.

B-7-12
C, D, E, EE, EEE-5-13

QUILON-TANNED

1633 – Brown blucher, Neoprene-crepe cemented outsole and heel, double-deck welt, Dacron stitched, no metal in outsole.

AA, A, B-7-13
C, D, E, EE-5-13

HEAVY NEOPRENE COMPOSITION

1210—6-inch light tan blu-bal. Outside counter pocket, plastic caulk welt.

C-6-12
D, E-5-13
EEE-5-12

NEOPRENE COMPOSITION

1502—6-inch black blucher, full oak leather middlesole, medium last, seamless back.

B-6-13
C, D, E, EEE-5-13

NEOPRENE NYLON CORD

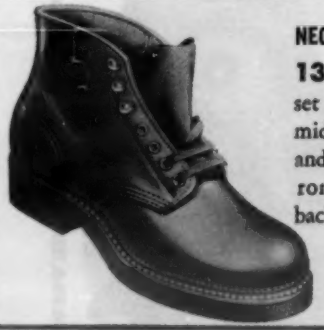
1300—6-inch black congress boot, Neoprene nylon cord outsole and heel, heavy elastic sidegores, medium last.

D, E, EE-5-13
EEE-6-12

NEOPRENE NYLON CORD

1310—6-inch Russet blu-bal, oak leather middle sole, leather storm welt, rawhide laces. Dacron stitched.

B-7-14
C-6-13
D, E-5-14
EE, EEE-5-13



NEOPRENE CORK

1308—6-inch Army russet blucher, oak leather middlesole, brass hooks and eyes, caulk welt, Dacron stitched, seamless back.

C-6-13
D, E, EE-5-13
EEE-6-12

RESISTS CHEMICAL CORROSION

1503—"CHEMASTER"—6-inch "Quilon" blucher, 18-iron Neoprene-composition outersole and heel, rawhide laces, Dacron stitched, seamless back, combination last.

B-7-12 C, EEE-6-12 D, E-5-13

FOR CHEMICAL, PACKING PLANTS, GENERAL UTILITY

L110—Black, all-rubber shoe with heavy-duty cleated sole, strongly reinforced throughout.

Whole and half sizes 5-13

VULCORK-NEOPRENE

1919—8-inch mahogany eskimo calf, leather middlesole, Ranger heel, Garrison backstay, leather storm welt. Dacron stitched soles.

C, D, E, EEE-5-13

10-INCH ENGINEER'S BOOT

1914—Mahogany retan, Neoprene oil-resisting composition outersole and heel, leather middlesole, plastic caulk welt, Dacron stitched soles.

B-7-12
C-6-12
D-5-13
E, EE-5-12
EEE-7-10

ALL STYLES INCLUDE
THIS ARMORPLATE STEEL TOE BOX
THAT RESISTS PRESSURES UP TO A TON!

Order thru your company—or assemble Group Orders for 12 pairs or more *(any styles)* and mail to——

Lehigh

SAFETY SHOE STORE

Emmaus, Pa.

BOOTH No. 16

GREATER NEW YORK SAFETY CONFERENCE

Hotel Statler, New York · April 11-18

Choose from Thom McAn's 40

If we don't make exactly the shoe you want—and its construction is possible

S-1378—Jaguar

S-4311—Leather Sole

S-4300—Nitro-Crepe

New idea in safety shoes, S-4386, the Ripple Sole† by Thom McAn.

LOOK at these terrific new opportunities for all safety shoe buyers!

New idea in Safety Shoes

Thom McAn introduces the new *Ripple Sole*† safety shoe. You will be amazed at its luxurious comfort. You get all the features of regular Thom McAn safety shoes *plus* the tremendously comfortable, shock-resistant Ripple Sole. And it's oil-resistant, too. This shoe, specially designed for workers who are on their feet all day, is the most comfortable safety shoe ever produced!

A tremendous new offer!

Thom McAn makes more than 40 different kinds of safety shoes for men—and women, too. People in every branch of industry get the shoes they want from us.

*But in case we do not have just the one *you* want—let us know! If its construction is possible, we will design a new safety shoe specially for you (minimum order 600 pairs—multiples of 12 pairs each size). For further details of this great new service, mail the coupon on the opposite page today.

Thom McAn

SAFETY SHOES

A Division of Melville Shoe Corporation

different safety shoe styles!

—we will design one specially for you*! Here are 10 styles—all job proved:

S-4209—Leather Sole

S-4131—Neoprene Cord

S-1012—Neoprene Cord

S-1031—Moulders

S-4135—Fully Insulated

S-1040—Neoprene Cord

You tell us!

Look at this coupon carefully. It's part of a brand-new service for safety shoe buyers. Just check off the way you prefer to buy safety shoes and mail the coupon to Thom McAn. We'll do the rest.

You may need specially designed safety shoes. Check the space for full information about this service. You can also get safety posters, plant promotion material, etc. Tell us what you need. We'll do our best to help you.

©1958 Melville Shoe Corporation
†Reg. Trade Mark. Beebe Rubber Co.

To: Thom McAn Safety Shoe Division, 25 W. 43rd St., N.Y. 36

Gentlemen:

Please send me the following at once: (Check services required)

- ☐ Address of nearest Thom McAn Safety Shoe Store
- ☐ Details of Thom McAn's Special In-Plant Fitting Plan
- ☐ Fully illustrated list of Thom McAn Safety Shoes
- ☐ Promotion material, safety posters, etc.
- ☐ Details of Thom McAn's "Special Design" Safety Shoe Service.

Name_____ Position_____

Address_____

City_____ State_____

A

Circle Item No. 99—Reader Service Card

Foot Protection

—*From page 135*

an emergency. This model is furnished with steel box toe.

Spark-proof shoes. Shoes with brass hooks and eyelets and brass nailed heels are worn in some industries where sparks from iron or steel might ignite flammable gases.

Shock-resisting shoes. Some are non-metallic with fiber or plastic box toes; others have steel box toes which are partially insulated. These shoes are designed for work around electric equipment. They are also worn by those handling flammable materials, by workers in explosive plants, and in grain products refining operations.

Conductive shoes are designed to drain off static charges to prevent their building up in the body to the point where they could cause a spark.

The conductivity of these shoes is affected by other conditions. Wool, natural silk, and nylon socks act as insulators to the body; cotton, lisle, or rayon are satisfactory. Foot powder also serves as an insulator.

The floor as well as the shoes must be conductive.

Rubber footwear. Where work must be done in deep mud or in water, rubber boots contribute to health, comfort, and safety. Rubber boots are available with steel box toes.

Soles and Heels

Slip-resistant soles and heels are good for general use since slipping hazards are frequently found where they are not expected. This type of footwear, however, is not a substitute for good housekeeping. No type of footwear will provide a sure footing where there are heavy accumulations of oil, grease, and other slippery materials.

Leather is comfortable and durable for normal conditions. Leather does not give satisfactory service where heat is excessive or where the shoe is subjected to constant dampness.

Rubber is resistant to moisture, alkalis and most acids. It deteriorates quickly when exposed to grease, oil, solvents, some acids, or excessive heat.

Neoprene resists moisture, also grease, oil and solvents that would ruin rubber. It stands up well against cutting and abrasion.

Cord soles and heels of rubber or neoprene, similar in construction to automobile tires, give good traction under severe conditions for many operations.

Cork blended with rubber or neoprene provides good slip resistance and the soles are light and flexible. Cork also helps to insulate feet against heat or cold.

Wood soles are used for extreme conditions of heat, dampness, oil, acids, or caustics underfoot. They are worn in steel mills, foundries, and other hot operations. They also afford protection against nails, broken glass, scrap metal, and other sharp objects.

Wooden-soled shoes can be obtained with steel toe boxes or with guards which cover toes and insteps.

Foot Guards

Where unusually heavy objects are handled, feet may need more protection than shoes with reinforced toes. For such work, there are foot guards of heavy-gauge, flanged, and corrugated metal.

The guards are strapped on over the shoes and protect the instep as well as the toes.

With the flange resting on a firm floor surface, foot guards should stand an impact of at least 300 foot-pounds without being dented sufficiently to damage the shoe underneath or injure the foot.

Foot guards are also made with soles of rubber or calked steel to minimize slipping hazards.

Combination shin-foot guards, with an aluminum alloy shin protector hinged to the foot guard, are available. * * *

FOOTWEAR FOR VARIOUS EXPOSURES

Types of Footwear	Exposure
1. Conductive	Moisture: 8, 9
2. Nonsparking	Standing in water: 8, 9
3. Foundry shoes	Chemicals: 4, 8, 9
4. Wooden sole	Oil and grease: 4, 9
5. Insulated	Electric current: 5, 8, 9
6. Felt pac	Cinders: 4, 10
7. Linemen's boots	Hot surfaces: 4
8. Rubber boots, overshoes	Molten metal: 3
9. Neoprene boots, overshoes	Sharp and abrasive surfaces: 4, 12
10. Asbestos overshoes	Cold, snow, ice: 6
11. Shower sandals	Explosion hazards: 1
12. Steel innersoles	Slippery surfaces: 13
13. Slip-resistant soles and heels (Cord and cork)	Skin infections, athlete's foot: 4, 11
14. Footguards	Handling extra heavy objects: 14

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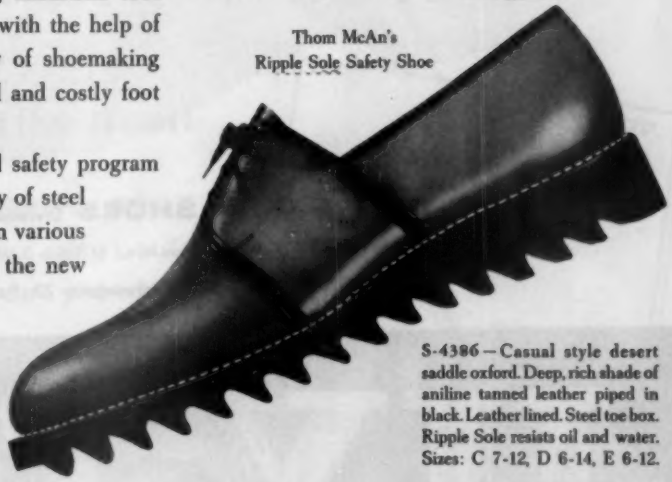
—RELY ON REGULAR SHOES!

. . . they offer no more protection against falling objects than a pair of socks.

The protection of industrial workers' feet is a joint enterprise. Only by the complete awareness of existing industrial foot hazards can the conscientious safety engineer, with the help of his safety shoe suppliers and their vast army of shoemaking technicians, stem the increasing tide of painful and costly foot injuries.

Safety Box Toe Company's part in this vital safety program is to develop and produce the very finest quality of steel toes. We offer your safety shoe supplier nineteen various styles of steel toes for his selection, including the new improved WINGUARDS . . . the latest development in steel toe protection.

Thom McAn's
Ripple Sole Safety Shoe



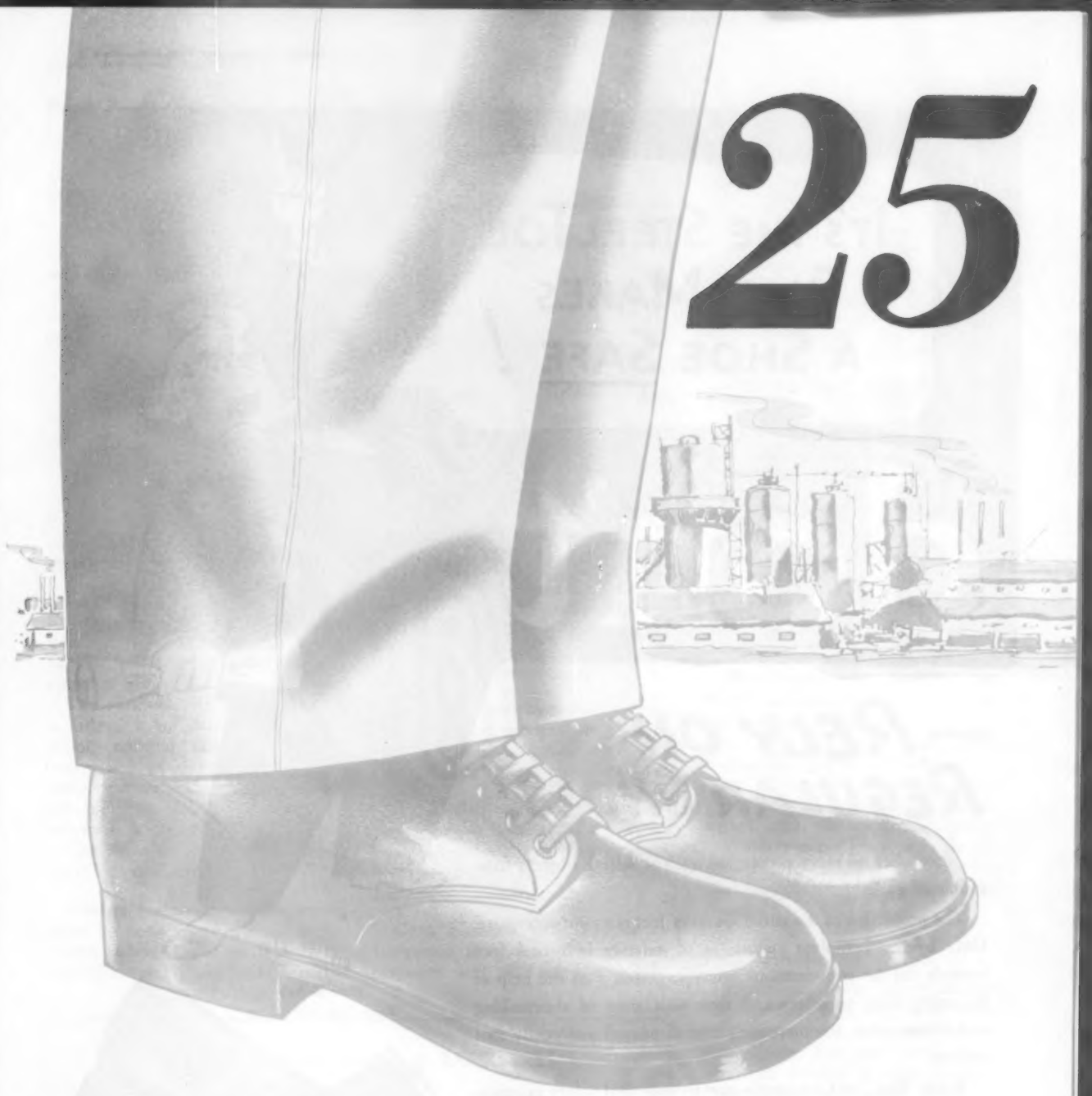
S-4386—Casual style desert saddle oxford. Deep, rich shade of aniline tanned leather piped in black. Leather lined. Steel toe box. Ripple Sole resists oil and water. Sizes: C 7-12, D 6-14, E 6-12.

Safety Box Toe Company

812 STATLER BUILDING · BOSTON

Circle Item No. 100—Reader Service Card

Circle Item No. 101—Reader Service Card →



HY-TEST SAFEty SHOES *Division*—INTERNATIONAL SHOE COMPANY

1509 Washington Ave., St. Louis 3, Mo.—Teletype: SL300

927 N. 3rd St., Philadelphia 23, Pa.—Teletype: PH476

HY-TEST

YEARS of PROGRESS

Today, when people think of Safety Shoes, most think of HY-TEST. That's because 25 Years of Progress has established HY-TEST as the largest selling in the world. And it is the leader because this Progress has brought forth such exclusives as the patented Anchor Flange Steel Box Toe, Bol Tan Sweat-Resistant Leather Insoles and Durisco Mildew-Proof Linings plus many other Standards of Quality.

Buy HY-TEST and Get the Best!

Have you received the new '58 HY-TEST Catalog? If not, write or wire St. Louis or Philadelphia. We'll forward one promptly.

First Choice in SAFEty SHOES

Have experience...will

NATIONWIDE DISTRIBUTION AND SERVICE

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Sales Manager

Charles E. Goffe
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Seattle, Wash.

Robert S. Franklin
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D. C. MacNaughton
Philadelphia, Pa.

Charles Garmann
Pittsburgh, Pa.

Did you know that...

Over half of America's largest corporations use

Iron Age SAFETY SHOES

In Fortune's Directory of the largest corporations in the United States, over half are customers of Iron Age. Yes, value counts, and America's biggest and best companies appreciate it, especially when the quality and craftsmanship built into Iron Age steel toe safety shoes benefit employees.

More and more the swing is towards the *high value, low cost* Iron Age line. Big plant or little, it will pay you to turn to Iron Age for all your safety shoe needs.

travel (and do) to help you!

Albert Belasco Pittsburgh, Pa.	**James M. Halliday** Grand Rapids, Mich.	**Robert H. Lohr** Home Office	**Andrew May** Chicago, Illinois	**Grace R. Christie** Buffalo, New York
Frank Donley Indianapolis, Ind.	**G. S. Alderson** Hinton, W. Va.	**Tommy Reynolds** Houston, Texas	**John McLaughlin** Plainfield, New Jersey	**Richard Gutowski** Home Office
H. D. Melton Huntington, W. Va.	**J. W. Taylor** Birmingham, Ala.	**Olis Farley** Marysville, Ohio	**Robert D. Burns** Boston, Mass.	**E. A. Meyer** Los Angeles, Calif.

Iron Age family of SAFETY SHOE SPECIALISTS

Iron Age people who know their business make it a point to help make your business safer and more productive. Yes, safety shoe experience is at your call when you consult any of these fine Iron Age representatives. They operate in all important industrial centers. And they have been thoroughly trained to tailor and install safety shoe programs to meet any individual plant's requirement.

Ask us to have an Iron Age representative survey your operation without obligation. He will recommend impartially the stock and styles that will best suit your needs; styles that will appeal most and result in an improved rate of employee coverage.

Iron Age DIVISION

H. Childs & Co., Inc.

Pittsburgh 12, Pa.

Circle Item No. 102—Reader Service Card

PERSONAL PROTECTION—Twentieth century vs. 16th century. (Falk Corp.)

Protective Clothing

FOR MOST plant work, ordinary types of work clothing will give adequate protection against body injury. Garments should be clean, in good repair, and suitable for the job.

Work clothes should be designed to meet these requirements:

—Adequate protection for the hazards of the job.
—Comfort and freedom of movement.
—Durability.
—Appearance.

Appearance is particularly important in equipping women workers but men are not indifferent to it.

Safety (protective) clothing refers to garments designed for hazardous jobs where ordinary work clothes do not provide sufficient protection.

Hazards requiring the use of protective garments include:

—Hot metal splashes.
—Sparks, as in welding.
—Flying objects.
—Fighting fires.
—Tapping furnaces.
—Shoulder bruises when carrying heavy loads.
—Splashing corrosive chemicals.
—Excessive moisture.
—Low temperatures.
—Sharp or rough edges.

Proper fitting is essential in all work clothing. Long, loose sleeves may get caught in machinery. Trouser cuffs may cause tripping.

Clothing soaked in oil or flammable solvent is ignited easily. Any organic solvent, flammable or non-flammable, may cause skin irritation. Clean clothing is also a recognized aid to morale.

Laundry service. Laundered overalls, coveralls, aprons, smocks, and other garments are furnished by the employer where extreme cleanliness is required in plant processes and where toxic materials are handled.

See chart on page 134 for types of garments and materials for various occupational exposures.

Standards

Specifications established by the Federal government have been widely used by private industry for many years. During World War II the American Standards Association approved a series of *War Standards for Protective Occupational Clothing—Series 18.* These are still accepted standards.

Specifications cover protection against sparks, molten metal, infrared and ultraviolet rays, and limited impact forces. Details of pattern, design, workmanship, and range of sizes are also included.

Materials

Asbestos has long been used for protection against intense heat and flame. Many garments are made of this material, including complete suits for fire fighting and rescue work.

Wool clothing should be worn under asbestos garments where intense heat is encountered.

Reflective material, such as aluminum foil, is used with insulation material to provide a radiation barrier as well as to protect the wearer against conductive heat. Originally developed by the U. S. Air Force for fire fighting and crash rescue work, these suits have found uses in industry and are available commercially.

Leather of various grades is used for protective garments. Chrome-tanned leather affords protection from sparks, molten metal splashes, and infrared and

—To page 149

Circle Item No. 103—Reader Service Card ⟶

TOUGHER!

The *one* Neoprene Cork Sole that does *not* compromise wear for weight!

BILTRITE SAF-T-STEP NEOPRENE CORK SOLES

Expressly compounded to meet both the *demand* for lighter weight and the *need* for longer wear.

- *Resist oil, grease, chemicals and acids*
- *Resilient, flexible, long wearing*
- *Special high grade lighter weight compound*
- *Styled for modern industrial use*

Biltrite Industrial Soles also available in

Super-Lite Cork

Nylon Cord Neoprene

Saf-T-Cel Neoprene

Surestep Neoprene

World's largest producer of shoe soling materials

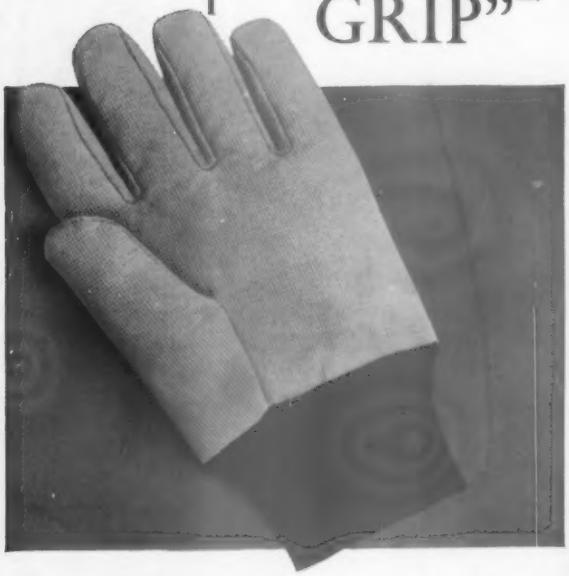
BILTRITE
HEELS AND SOLES

AMERICAN BILTRITE RUBBER COMPANY Chelsea 50, Mass.

Warehouses: 4464 District Boulevard, Los Angeles — 1010 Gratiot Street, St. Louis — In Canada: American Biltrite Rubber Co. (Canada) Ltd., Sherbrooke, Que.

LABORATORY TESTS PROVE NEW

Riegel "MIGHTY-GRIP"™



OUTWEARS FIVE 8-oz. GLOVES . . . OUTGRIPS 'EM 4 TO 1

Even outlasts, outgrips other "long-wearing safety-grip" gloves, yet costs 17 to 41 cents less per pair! That's Riegel's new feather-light, "Mighty-Grip" industrial glove. Every square inch contains 300 tough, non-skid plastic dots permanently molded into the fabric. The dots take all the wear . . . and the fabric "breathes" for day-long hand comfort.

OUR LAB TESTS PROVE:	MIGHTY-GRIP	BRAND "X"	STD. 8 OZ. FLANNEL
Flat Abrasion Resistance	2540 cycles	1690 cycles	490 cycles
Grip-Ability	380 grams	190 grams	90 grams
Perspiration Evaporation Rate (Through Fabric)	4.7 grams	1.2 grams	4.4 grams

NOW HAVE *YOUR* LAB CHECK THE FACTS!
Write or phone today for trial pair.

Slip-on "Mighty Grip"

Write today for free catalog

Band-top "Mighty Grip"

INDUSTRIAL GLOVE SALES
RIEGEL TEXTILE CORPORATION
CONOVER, N. C.

Sales Offices:
Birmingham • Chicago
Detroit • Los Angeles
New York City

Riegel
... GLOVES THAT WEAR ON WHEN OTHERS WEAR OUT

Warehouses:
Chicago • Conover, N. C.
Detroit • Greenville, Ala.
Los Angeles
New York (Paterson, N. J.)
Oklahoma City
Portland, Ore.

How Oliver Corporation Saves $35.00 per man with...

Riegel WELDER'S GLOVES

"The Riegel No. 99 Heavy Welder lasts six weeks against two weeks for the glove we used formerly. The men tell us it's more comfortable and cooler."

So reports Mr. Richard Thornell, whose switch to Riegel now saves $35.00 yearly per man at Oliver Corporation, Springfield, Ohio.

No. 99 facts: Heavy but flexible "flextan" welders' leather, gunn cut, wing thumb. Extra roomy, extra long. One-piece back, wool-insulated . . . all exposed seams welted . . . full protection against heat and sparks.

Riegel has the service you want, too . . . industrial specialists to help select the right style . . . eight warehouses to speed delivery. Write or phone today.

Spot Welder No. 89

Service Welder No. 199

Welder's Mitten No. 98

INDUSTRIAL GLOVE SALES
RIEGEL TEXTILE CORPORATION
CONOVER, N. C.

Sales Offices:
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Riegel
... GLOVES THAT WEAR ON WHEN OTHERS WEAR OUT

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Detroit • Greenville, Ala.
Los Angeles
New York (Paterson, N. J.)
Oklahoma City
Portland, Ore.

Circle Item No. 104—Reader Service Card

Protective Clothing

—*From page 146*

ultraviolet rays. Any kind of leather, however, deteriorates under continued heat. For severe exposure, asbestos should be used.

Leather provides protection against limited impact. Padded leather or fabric aprons and hard fiber or metal protectors for the abdomen absorb much of the force of hard blows.

Leather reinforced by metal stitching or wire staples is resistant to cuts and abrasions.

Impervious materials of many types provide protection against dust, vapors, mists, moisture, and corrosive liquids. They are useful in handling materials which would cause dermatitis or burns. This type of material includes rubber, neoprene, and vinyl films and fabric coated with them.

Rubber resists acids, caustics, and other corrosive substances, as well as moisture. Garments of rubberized fabric are used when handling low concentrations of acids and non-caustic liquids and for protection against weather. Rubber's high dielectric strength makes it useful where electricity is used.

Neoprene has numerous applications in safety equipment. It forms a tough durable film resistant to oils, solvents, acids, and alkalis. It has high dielectric strength.

Vinyl plastic has many uses in safety equipment. For some garments the plastic is rolled or calendered onto fabric. For others the strong pliable film is used without backing.

Flame-resistant duck, a lightweight fabric, is quite strong and will outwear ordinary material used in work clothes. For protection against extreme heat, asbestos should be used.

Water-resistant duck is recommended in exposures to water and non-corrosive liquids. It combines strength and durability with light weight.

Synthetic fabrics, such as dynel, orlon, and vinyon, are used for durable work clothing. These fabrics resist acids, caustics, mildew, abrasion and tearing. They stand up well under repeated laundering. They should not be used where static sparks might cause an explosion.

Aluminized duck and drill are used for garments where radiated heat is a problem.

DISPLAYS of personal protective equipment are effective reminders.

Flameproofing

Fabrics cannot be made noncombustible but some treatments provide limited fire resistance. There are two principal types of treatments, (1) Water soluble. (2) Weather resistant.

Commercial and homemade water soluble treatments are effective but must be renewed with each laundering. Weather-resistant treatments for canvas, duck, and other fabrics used for awnings, tent, tarpaulins, truck covers, and welding curtains require special processing which can best be done by finishing mills or chemical companies equipped to do this work.

Dust removal. The practice of using compressed air to blow dust from hair and clothing may cause serious injury to eyes and ears. Brushes or vacuum equipment should be provided for this purpose and the use of compressed air forbidden.

Welder's Clothing

Protective clothing is as much a part of the arc welder's equipment as the helmet and goggles. Cotton shirts and dungarees worn in warm weather can be ignited quite easily. Garments of chrometanned leather may prevent serious burns.

Leather garments include overalls, pants, chaps, aprons, jackets, sleeves, gloves, mittens and spats.

Garments should be of good quality leather, solidly constructed. Fastenings must prevent gapping and should be so designed that the wearer can get out of the garment quickly. There should be no turned-up cuffs or other projections to catch hot metal. Pockets should have flaps. * * *

Hands and Arms

FINGERS, hands, and arms are involved in approximately one-third of all reported occupational injuries, to say nothing of a large number of unreported first aid cases. Although the worker returns to the job, there is time spent in treatment and perhaps reduced efficiency for a few hours.

These parts of the body, so essential in performing every type of work, are exposed to many cuts, scratches, burns, and bruises in the course of a day's work.

Finger movement is necessary for practically all jobs, which makes protection more difficult than for most other parts of the body. For the forearm, semi-rigid protectors are often practicable.

Types of protection available in a wide variety of styles and materials include:

—Gloves
—Mittens
—Hand pads
—Arm protectors
—Sleeves
—Protective creams
—Finger guards

Generally, gloves, mittens, or hand pads should not be worn around revolving machinery. An exception is buffing and polishing on high speed lathes where parts become too hot to handle with bare hands.

Ordinary cotton work gloves offer some protection for the hands on light jobs but many industrial operations require hand protection of more durable material in a variety of specialized designs.

Common materials are:

Canvas—relatively low in price and suitable for light work. It is washable.

Duck and **terry cloth**—used for handling objects which are not too rough, sharp, or hot.

"Hot mill" gloves are made from a heavy twisted weave fabric which also gives good service for handling rough objects.

Leather—more expensive and more durable for most industrial uses. It offers greater protection against cuts and abrasions.

Chrome leather is used where there is exposure to sparks or molten metal. However, no material of animal or vegetable origin will stand continued excessive heat.

Asbestos—used where hands must be protected against extreme heat, as in steel mills, heat treating plants, welding, galvanizing, glass manufacturing, etc.

Asbestos gloves may be obtained unlined or with wool lining for added comfort and protection.

Heat-repelling mittens of aluminum-coated fabric between two layers of asbestos, jersey lined, offer unusual protection against heat. These mittens are reversible.

Rubber, neoprene and vinyl films—suitable for chemical laboratories and plants where acids and other corrosives are handled.

Neoprene and vinyl are particularly useful where petroleum products and organic solvents are handled. Synthetic films vary in their resistance to chemicals and the manufacturer should be consulted about exposures.

Fabrics coated with rubber, neoprene or vinyl are used for light cleaning operations. They offer greater protection against abrasion than uncoated fabric.

When rubber or plastic gloves are worn for long periods, a lightweight cotton liner is desirable. If no liner is available, talcum powder should be shaken into the gloves before wearing.

Rubber, plastic and asbestos gloves should extend well above the wrists. Gauntlets should have locking devices to assure a snug fit about the wrists. Sleeves should be kept rolled down, leaving no skin exposed.

Metal mesh gloves—used in meat and other cutting. They should fit snugly.

Metal staples in gloves, mittens and hand leathers give increased protection when handling sharp or rough objects. Metal-studded gloves should not be worn around electric apparatus.

Lead-rubber gloves—protect the hands against x-rays and the gamma rays of radioactive materials. They are worn by medical, industrial, and nuclear technicians. The glove may include a leather outer covering to prevent damage to the lead-impregnated rubber.

Lead-leather gloves—also available for radiation exposures.

Linemen's gloves are rubber gloves worn by linemen and others engaged in electrical work. They are of a special type made to exacting specifications. They should be tested regularly and discarded when found worn, cracked, or punctured.

For line work, overgloves of leather protect the rubber against damage.

Gauntlets offer some protection to the wrist.

Arm protectors guard the forearm against light blows. The materials, depending on the protection required, include duck, wool, leather, rubber, plastics, and asbestos.

Finger stalls may be used where a complete glove is not necessary.

These are available in combinations of one or more fingers. Materials used are rubber, leather, plastics, duck, asbestos, and metal mesh.

Hand pads are often more satisfactory than gloves for protection from heat, abrasion, or splinters. They can be heavier and less flexible than gloves.

Hand pads are obtainable in leather, asbestos, and twisted weave fabric.

Protective Creams

Creams are helpful in protecting the skin against many irritants when safety clothing is not practicable. These products are made in water-soluble and water-resistant types, each in several grades for differing exposures.

Water-soluble creams are used

BEARFOOT SAFETY SOLES

NOW Safer for busy feet

Bearfoot Neoprene-Aircushion soles now available with new non-slip additive.

This new non-slip grit material, dispersed throughout the sole, is constantly exposed on the walking surface for the life of the shoe. This development greatly increases the non-slip safety factor in Bearfoot safety soles.

Where rough hazardous going is routine, where all day long comfort is essential, Bearfoot Neoprene-Aircushion Grit soles meet every need.

A trusted name on shoe bottoms since 1924

THE BEARFOOT SOLE COMPANY, INC., Wadsworth, Ohio

- BOSTON: 210 Lincoln Street, J. M. Calvin
- ST. LOUIS: 1602 Locust Street, F. E. Alston
- MILWAUKEE: 1931 South Allis, Atkinson Sales Company
- NEW YORK CITY: 225 West 34th Street, Homer Bear

Circle Item No. 105—Reader Service Card

for protection against cutting oils, paints, lacquers, varnishes, etc.

Water-resisting applications are used where the cutting oil, cooling lubricant, or other irritant has a water content of more than 10 per cent. These can be removed with soap and warm water.

To be effective, coatings should be renewed frequently. They are not intended for protection against highly corrosive substances. * * *

Leg Protection

PROTECTION for the legs is required where workers are exposed to the hazards of hot materials, corrosives, blows from sharp tools or heavy objects, and bites of poisonous snakes.

Garments commonly used are:

—Spats
—Leggings
—Skin guards
—Knee pads

Leggings. Most of the leggings used in industry are worn by men who handle molten metal—in foundries, open hearth, and blast furnaces. These leggings are available in asbestos, chrome leather and fire proofed duck and in spats, knee length and hip lengths.

Leggings for men who work with molten metal have flares to protect the instep and are free from projecting buckles and clasps. They can be removed instantly in an emergency.

Leggings for chemical workers are made from impregnated duck. They are available in ankle, knee and hip lengths.

Where poisonous snakes are a hazard, fiber leggings or high boots are worn by construction, public utility, and farm workers. Coverings of waterproofed duck protect the leggings against long wet grass.

Shin guards of metal or fiber provide important protection where axes or adzes are used. Shin guards are available separately or combined with metal foot guards which cover the instep.

Knee pads are worn by electricians, pipefitters, riggers, cement workers, laborers, and others who must kneel more or less continually at work, particularly in confined spaces.

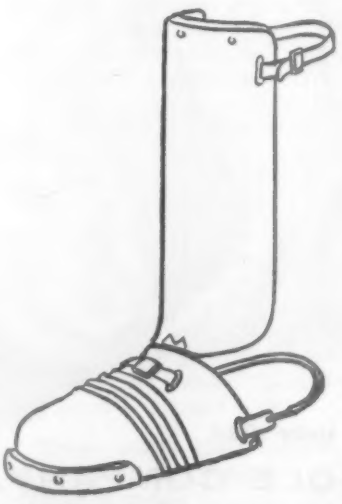
Two types are available. One consists of a pad or cushion about 10 x 14 in., made of chrome leather or asbestos cloth. This type is used for kneeling on hot surfaces. The other type is made of solid or sponge rubber molded to fit the contour of the knee. Straps keep the pads in place while the wearer is either kneeling or standing.

Materials and Uses

Materials commonly used are:

Asbestos—for protection against molten metal, extreme heat and heavy sparks.

Leather, chrome tanned—for less severe exposure. Chrome leather, when new, is less resistant to splashes and sparks. With use it acquires a tougher surface. The operator should therefore keep out of the line of fire as much as possible until the garment is broken in.



BOTH feet and legs are protected by this combination of shin and foot guards.

Fire resistant duck—to ward off light splashes and sparks.

Rubber, neoprene, plastic, and impregnated duck—for work with acids, alkalis, and hot water.

Lightweight metal or **fiber**—for protection against blows from tools and heavy objects. * * *

Protection for Electrical Workers

Special tools and protective equipment have been developed for linemen and generating station employees. Operating conditions vary but certain items are standard.

Tools used near energized equipment should be designed for the job and insulated to minimize the danger of shock to the operator. Insulation on tools alone, however, is not adequate protection near high voltages.*

Items in common use include:

Linemen's rubber gloves
Leather protector gloves
Rubber line hose and blankets
Linemen's belts and safety straps
Climbers
Rubber coats
Tool pouches
Tool buckets
Fuse pullers
Switch sticks
Insulated stools
Switchboard mats

Protective hats of insulating plastic or fiberglass are becoming standard equipment for linemen.

Regular and thorough inspections should be provided for all protective equipment. Defective items should be replaced immediately.

Brooms, brushes, and other cleaning equipment used around energized equipment should be free from metal. Insulating handles of tools should be kept clean and dry and only nonconducting preservatives used on them.

Metal ladders should not be used around electrical equipment.

In emergencies where areas are wet, wood platforms or insulated stools should be used or rubber boots should be worn by maintenance workers.

* See *Specifications for Rubber Protective Equipment for Electrical Workers,* ASA Series J6.

Combustibility of Fabrics

Acetate. Ignites readily, melts and burns quickly but somewhat less so than rayon or cotton.

Acrilan. Ignites readily, melts and burns like cotton.

Cotton. Burns rather rapidly.

Dacron. Ignites with difficulty, melts and burns slowly.

Dynel. Difficult to ignite, melts but does not support combustion.

Fortisan. Burns rapidly but is more resistant to heat than cotton or linen.

Nylon. Quite difficult to ignite, melts but does not support combustion.

Orlon. Ignites readily, melts and burns like cotton.

Polyethylene. Melts and burns very slowly.

Rayon. Ignites readily and burns rather rapidly.

Saran. Ignites with moderate difficulty, self-extinguishing, melts but does not burn.

Vicara. Burns rather easily but less flammable than rayon and cotton.

Vinyon & Vinyon N. Difficult to ignite, melts but does not support combustion.

Wool. Burns slowly, tending to be self-extinguishing.

X-51. Melts at open flame.

If the Shoe Doesn't Fit

Some 65 per cent of the men and 75 per cent of the women in industry are said to suffer from corns, callouses, bunions, fallen arches, and other foot ailments.

Poorly-fitted shoes are blamed for most of these troubles. Many of these shoes are apparently comfortable and well-fitting. However, a shoe may feel comfortable without giving adequate support. It may even upset the normal balance of the foot.

Short shoes are common offenders. When too short from the heel to the ball of the foot they can cause more trouble than shoes which are too narrow.

Shoes that do not allow normal foot movement cause much foot fatigue.

If a shoe doesn't fit, it isn't really a safety shoe. Much of the success of any foot protection program depends on fit and comfort.

Specially Designed

WITH SAFETY IN MIND

SLIP RESISTANT
PUNCTURE RESISTANT

Here they are . . . three great soles that have the two most important essentials of a safety shoe sole . . . Slip Resistance and Density of Material.

Each sole has been specially developed to give greater safety . . . greater comfort . . . and longer wear under specific working conditions.

Remember—it pays to "Sell 'em the shoe with the Sole for the Job". Write today for the free Gro-Cord sole selector . . . It instantly tells you the best sole for any of 50 basic jobs.

RESISTS-
OIL
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ACIDS
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GC10

Circle Item No. 186—Reader Service Card

Safety Belts and Harnesses

SAFETY BELTS or harnesses with life lines are required:

—For work at high levels
—In closed spaces where air may be irrespirable
—Where there is danger of being buried by slides of loose material.

Occupations in which safety belts are used routinely or occasionally include:

—Structural steel and bridge workers
—Window cleaners
—Public utility linemen
—Cranemen
—Forestry workers
—Miners
—Mechanics
—Painters
—Workers entering tanks, bins and underground passages.

In selecting equipment, consider two types of use—normal and emergency.

Normal use involves comparatively light stresses applied during regular work. These stresses rarely exceed the static weight of the wearer.

Emergency use means stopping a man when he falls. This may subject every part of the belt to an impact loading many times the weight of the wearer.

Types of Equipment

Types of belt and harness have been developed for various occupations. Most familiar are the lineman's belt and safety strap and the window cleaner's belt.

These belts are built for extra severe use. Both belting material and hardware are the result of much research and experience in the field. Belts are usually serially numbered and dated so records of age and condition may be kept.

Materials. Leather and cotton or linen webbing belts are provided by most manufacturers.

Well-tanned and oiled leather resists most chemicals but it should not be left in contact with them. Regular cleaning after use is important.

Leather ¼-in. thick and 1½-in. wide will have an ultimate strength of about 500 lbs. This is adequate for lifting a man out of a tank or bin.

Webbing will stand more heat than leather, and after soaking in water, will dry out in its natural condition. Friction buckles can be used with webbing, avoiding loss of strength at buckle holes.

Belts intended to check a fall demand strength proportionate to possible distance of fall and weight of body. A 2″ x ¼″ leather belt would probably arrest the fall of a window washer at 6 ft. It might break at 10 ft.

For a comfortable margin of safety, a window cleaner's leather belt should be at least 3″ x ¼″.

Webbing of special type is available for certain uses. It can be treated to resist paint and mildew. For the chemical and petroleum industries, webbing impregnated with neoprene resists acid conditions.

Quick release from a safety belt may be desirable in case of fire. Petroleum workers, for instance, use belts with a quick release buckle which can be disengaged instantly by a single motion of the hand.

SAFETY BELTS and life lines, also hard hats, are worn by this clean-up crew in a chemical plant. A dual tone signal horn powered by freon gas can be sounded in an emergency.

Belts for some occupations contain loops and pockets for light tools.

For many occupations a lighter belt will provide ample protection. These may be of the simple body type or the harness type. Both types have a **D** to which a life line is attached. The harness type distributes the shock over the shoulders, back, and waist instead of concentrating it at the waist.

Body harness with life line attached expedites rescue if the wearer should be overcome by gas or vapors, buried by falls of loose materials or injured in confined spaces.

Wherever work requires a supplied-air respirator, harness and life line rather than a belt should be used.

If long free falls are possible, harness should be designed to distribute the impact force over legs and chest as well as waist.

The longer the free fall, the greater the impact force exerted upon harness and life line. Tie off the line as short as movements of the worker will permit.

Boatswain's chair. Where a belt must support the entire weight of a man while he works, as in raising and lowering him along the wall of a building, a boatswain's swing chair should be used. In this type of belt, one strap is used as a seat, sometimes with a board to make it more comfortable. Attached to the seat strap at each side is a strap around the waist to prevent his falling out of the seat. The waist strap permits the wearer to stand or sit.

Collapsible canvas tool buckets are also needed on some jobs so the worker may have his hands free while climbing. Edge tools should be protected by guards while being carried.

—*To page 207*

GOODALL

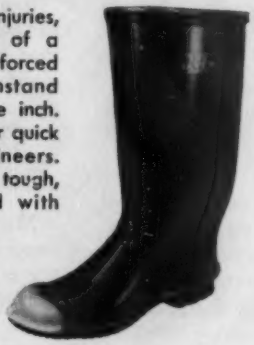
SINCE 1870

Safety PRODUCTS

The Goodall products described below are made to the highest standards for quality in materials and workmanship, with their safety features thoroughly proven in service to many industries. You can purchase them with complete confidence that they will fulfill their intended purpose to your entire satisfaction.

"TOE-SAVER" ® SAFETY BOOTS

Surest protection against toe injuries, with all the wearing comfort of a first-quality boot. Built-in, reinforced steel toe cap tested to withstand 2,000 lbs. pressure per square inch. Covered by a white toe cap for quick identification by Safety Engineers. This boot is made of smooth, tough, flexible black rubber, lined with heavy duck. A cushion insole adds to its comfort, and a tire-tread outsole guards against slipping on wet or greasy floors. Available in all boot sizes, in full hip, three-quarter and short.



"RUBBERHIDE" SAFETY INNERSOLES

Eliminate foot injuries resulting from punctures by nails and other sharp-pointed underfoot objects. Made with sheet of thin, high-tensile spring steel, inseparably bonded between layer of top-grade sole leather, and layer of rubberized canvas duck. Extremely flexible, light in weight, "easy to wear". In all rubber boot and boot-last shoe sizes.

"HARDBOILED" SAFETY HATS

FIBREGLASS OR ALUMINUM

The ultimate in head protection, yet light-weight and comfortable. Exceed highest established requirements for strength; heat, fire and moisture resistance; and dielectric tests. Wide range of colors.

"GOODSEAL" SAFETY GLOVES

Made of a special rubber compound that withstands constant contact with virtually all solids and solutions. Smooth, flexible, and highly resistant to snagging and puncturing. "Goodseal" Gloves are available in light, medium and heavy weights, some styles having turned-up cuffs to keep chemicals and acids from arms and clothing.

PROTECTIVE SUITS, COATS, APRONS

A style for every kind of work in field, plant or laboratory, in rubber, neoprene latex and oiled. Designed for maximum protection and comfort, and made to assure unequalled value through durability and long wear. Write for copy of special Clothing Catalog.

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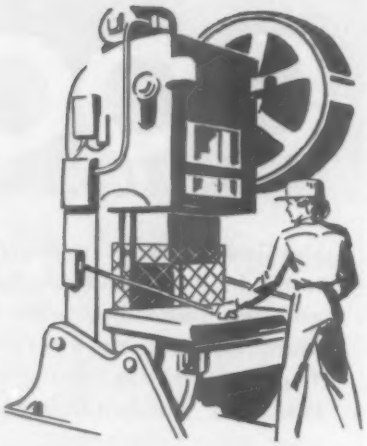
Circle Item No. 107—Reader Service Card

If You Employ Women

Add a few refinements to the health and safety measures you provide for men



LAWS governing the employment of women are now in force in most states. Some of these are quite detailed; others cover only the barest essentials of employment.

Safe, hygienic working conditions are the right of every employee—male or female. However, women are generally more sensitive to their surroundings than men and certain refinements in their surroundings are generally desirable.

Copies of state regulations are available from state labor departments. The Women's Bureau of the U. S. Department of Labor has also compiled much information on the employment of women.

For successful placement, the Women's Bureau offers these recommendations:

1. Survey jobs to decide which are suitable for women.
2. Adapt jobs to fit their smaller frames and lesser physical strength. (Generally about 60 per cent the strength of men.)
3. Provide service facilities to accommodate the anticipated number of women.
4. If the number of women employed justifies it, appoint a woman personnel director and the head of a women's counselor system.
5. Select women carefully and for specific jobs.
6. Develop a program for induction and training.
7. Maintain safe, healthful, and pleasant working conditions.
8. Supervise intelligently.
9. Give women equal opportunity with men.

The Medical Department should know job requirements to determine whether the applicant has the physical and mental qualifications. Some of the factors include:

1. Skill and knowledge required.
2. Physical exertion required.
3. Operation hazards, exposure to moving machinery.
4. Amount of sitting and standing.
5. Contacts with toxic dusts, fumes, gases and odors.
6. Finger dexterity, vision, whether working alone or with others.

Women are supposed to excel in routine, repetitive operations, and in those requiring finger or hand dexterity, assembling small parts, inspecting, packing, work requiring alertness and care, or the use of light instruments. Many of them do, of course, but it should not be assumed that every woman has these qualifications.

The important points to remember are that women have less physical strength than men and that many jobs must be adjusted to their physical characteristics.

Special adjustments should be made at these points:

1. Guards should be set close enough that the woman's smaller hands cannot enter the openings.
2. Height of benches, distances away from piece parts, and foot pedals or hand controls should be reset to conform to the generally shorter stature and reach of women.
3. Extensions of levers on machines, tools, and equipment to produce the same force with less effort.
4. Use of lighter and longer wrenches to reduce strain on operators.
5. Suspension and counterbalancing of heavy hand tools where substitution of lighter tools is impractical.

Seating is vitally important. Arrangements should be made so that women can change from a standing to a sitting position. In muscular work, output has been found to increase from 2 per cent to 13 per cent when workers could alternate sitting and standing.

Material Handling. Women should be trained in proper lifting methods, just as men workers are, and their limitations must be remembered. The following weights, in compact form, are within the safe limits for male and female workers required to perform continuous or repetitive lifting operations:

Male workers—50 lbs.
Female workers—25 lbs.

Mechanized lifting and conveying devices are desirable. Unnecessary lifting from one level to another and stacking above shoulder height should be avoided.

Protective Equipment

Special clothing is needed by women:

1. To protect them from being caught in moving machinery; from the hazards of dusts, gases, fumes, or acids; from flammable materials; from flying and dropped objects; from material on floors; from ordinary dust and dirt.
2. To reduce fatigue.
3. To improve morale.
4. To keep the product clean.

Women require the same safety features in protective clothing

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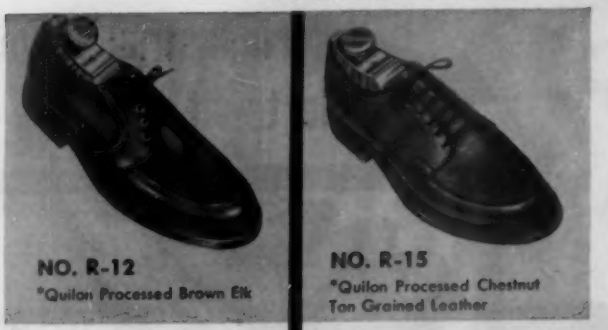
add 'pleasure' and 'bounce' to every work day!



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See the difference in their style . . . feel the comfort of the soft-textured leathers . . . notice month after month the difference in their long, long wear!

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Soft, Desert Butternut "Dress Glove" Tannage, Popular Thick Non-Slip Wedge Cushion-Crepe Treaded Sole, Full Cushion Insole. Completely Leather Lined. Dacron Stitched. Genuine Rawhide Laces.

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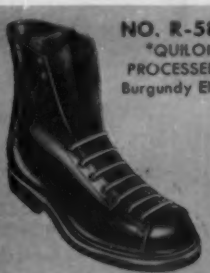

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Standard weight, abrasive-resistant, liquid-proof
7703 NEOPRENE COATED
14½" industrial weight with natural-fit fingers

No matter what the job, there's a Hood Industrial Glove that fits it perfectly. The style, shape, materials and treatment of every Hood Glove are determined by the requirements of a *specific kind of work.* That's why it's important to specify "Hood"—the glove that's "tailor-made" for the job.

Write today for free 1957 Hood Glove Guide — shows you how to choose the RIGHT glove for EACH job.

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and equipment as men, but appearance is important, as many women object to "unflattering" garments.

Most women will listen to reason, however. Educational campaigns, exhibits of uniforms, head coverings, shoes, and other safe clothing will help. Too, suppliers recognize women's vanity and offer clothing and equipment styled so it will be acceptable.

Work clothing for women should be comfortable in any temperature in which it is worn. It should also be appropriate for the job and, where possible, attractive. Suitable dresses, uniforms, and smocks are available and, where skirts are a hazard, slacks and coveralls are used. Clothing must fit and not interfere with the worker's movements. Tight-fitting garments cause strain and increase fatigue.

Outer garments should avoid loose sleeves, tails, full skirts, flounces, ties, lapels and cuffs. No loose-fitting open sweaters should be worn. Jewelry, too, can be a hazard and should be avoided on the job.

Head and hair protection. Caps with stiff visors, hair nets, and ventilated turbans are available to protect hair from catching in moving belts, spindles, and other moving machinery and equipment. Paper caps are used in some food plants where the main object is to protect the hair and scalp from dust or to keep foreign material out of the product. These are usually provided by management and are changed frequently.

Static electricity is a hazard to consider, for it pulls hair toward machinery where, if not confined, it can be caught in moving parts.

Hand and arm protection. Gloves should fit snugly, should not be cumbersome, and should extend a sufficient distance beyond the wrist to fit under sleeves.

Sleeves should reach from the wrist to the armpit and should be fastened at both ends. They should fit over the gloves and should be roomy enough to allow for flexing the elbows without sliding up and down the arm.

—To page 165

Circle Item No. 110—Reader Service Card

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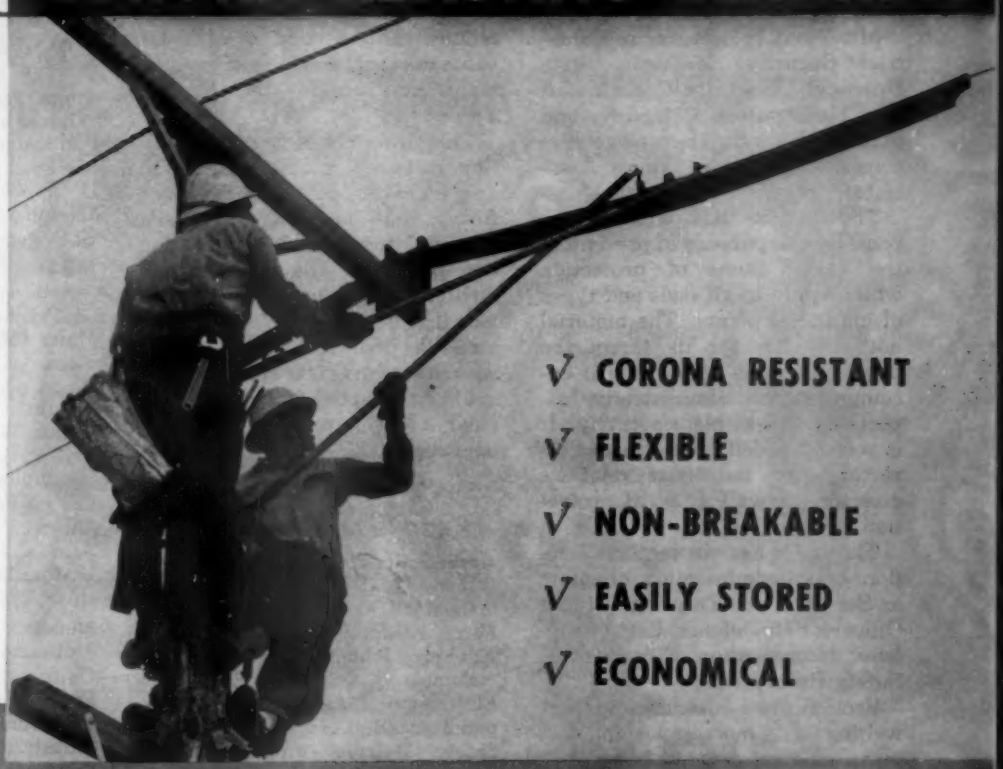
New!

UBANGI LINE HOSE
UBANGI INSULATOR HOODS
CORONA RESISTING BLANKETS

For use with live line tools on circuits which are energized up to and including 15,000 volts.



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THE SAFETY LIBRARY

Books, pamphlets and periodicals of interest to safety men

Compiled by Ruth Parks, Librarian, NSC

Plant Security

Industrial Plant Protection, by John Richelieu Davis, 566 pages, published by Charles C. Thomas, Springfield, Ill., 1957, $12.00.

Industrial Plant Protection is an intelligent, really complete textbook and certainly is a great step forward in the development of plant security literature.

Mr. Davis is Lecturer in Industrial Security, Michigan State University, Security Coordinator, The Hallicrafters Company, and operates his own plant protection consultation service, Davis Associates.

The author has written this book for the purpose of presenting the major items of protection which apply to all sizes and types of industrial plants. The material not only has for its target the plant protection officer, but it encompasses the administrative aspects as well as plant security. It is recommended for personnel directors and industrial relations directors as well as plant protection officers.

The book has six sections: section one includes such chapters as Selection and Training of Plant Officers; Self Defense; Legal Problems; Interrogation; Firearms . . . Safety Precautions.

Section two discusses report writing . . . a most important skill in an efficient organization.

Section three discusses personnel Selection, Internal Control; Identification of Employees; Control over Shipments; Parking Problems; A Typical Master-Key System . . . a vital asset to plant protection in case of emergency.

Section four includes such chapters as: Heat and Fire Principles; Prevention of Industrial Fire Hazards; Control of Fires and Extinguishers; Arson; and Computation of Fire Rates.

Section five discusses Accident Control Programs . . . this section deals with Safety Committees; Safety Organizations; Suggestion System; Safety Inspection; Inspection of Power Transmission; A Checklist; Importance of Accident Investigations; and Good Housekeeping.

Section six discusses Armed Forces Industrial Security Regulations. This section is of great value to plants working on government contracts for the Armed Forces.

The author has made use of illustrations throughout the book . . . including copies of excellent forms and diagrams . . . most essential for a good organization and program. The book is well written, easily read and understood, and could serve as an invaluable tool for the industrial security administration. Much could be adapted from it for efficient plant security program operation.

J. C. KATO

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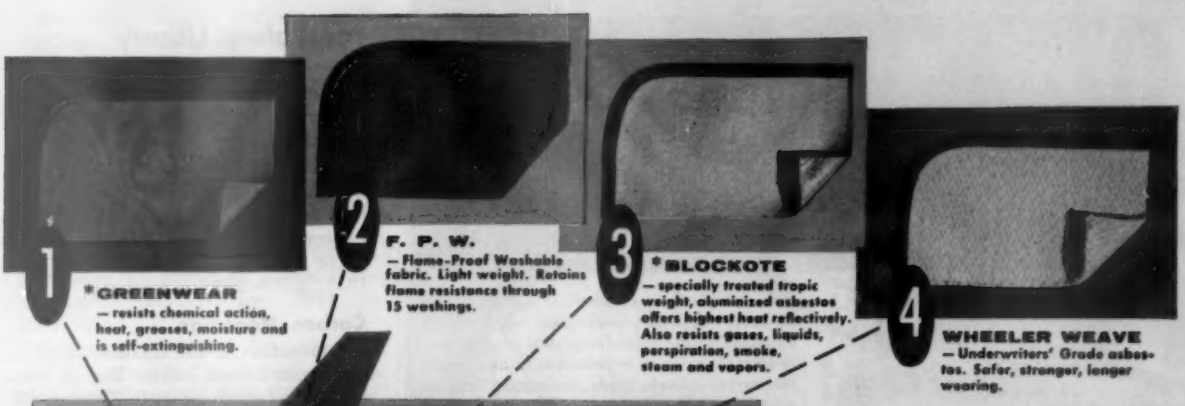
—*To page 162*



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Another big step in Wheeler's program to provide the most complete line in the Safety Apparel field. Four new *exclusive* fabrics are yours to choose from, each with special properties: Chemical and grease resistance, a new washability for flame proof clothing, new high-heat resistance levels, and a greater durability for asbestos cloth.

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Exclusive *GREENWEAR — Attractive light green garment. Resists chemicals, oils, greases, moisture and heat. Self-extinguishing.

Exclusive F. P. W. (Flame-Proof washable) fabric suit. Appealing green cloth that holds its flame resistance through 15 washings.

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Circle Item No. 111—Reader Service Card

LOOK TO STEEL-GRIP FOR BETTER PROTECTION AT LOWEST COST

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JAXCOLITE

Amazing new compound makes asbestos, duck and burlap garments extremely resistant to heat, molten metal splash, acids, caustics, oil and water. Long wearing and low cost. Users won't buy anything else. Nothing to compare with it. Available in coats, pants, aprons, sleeves, leggings, spats, hoods, etc.

HEAT REPELLENT ALUMINIZED ASBESTOS

Aluminized surface reflects up to 95% radiant heat. Asbestos body resists fire. Result is cool safe protection. Available in all body protection garments.

SEE THESE PRODUCTS AT THE NEW YORK SAFETY SHOW BOOTHS 9, 10 AND 11

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Spring-type Leggings made of chrome leather, flameproof duck or asbestos. Easy to put on and off. Air-pocket lining for comfort. Special close-fit collar. Tuck-in flaps protect back of legs. Many types of aprons available in all materials and styles. Tell us what you want.

To be sure of the Genuine Demand this Trade Mark.

CERTIFIED ASBESTOS SAFEGUARDS

A Steel-Grip "first". Steel-Grip has own laboratory, tests all its raw materials. Our tests show following specifications give longest wear, greatest strength: Minimum of 83% asbestos, maximum of 17% long fiber cotton content. 20 warp ends per inch, 10 woof ends per inch. Minimum weight 2.47 lbs. per yard. Warp tensile strength min. 145 lbs. Woof tensile strength min. 65 lbs. Every Steel-Grip asbestos safeguard certified to you to meet or beat these specifications. Your guarantee. Demand this certified label. Coats, pants, gloves, mitts, etc.

STEEL-REINFORCED LEATHER GLOVES AND MITTS

Finest quality chrome-tanned leather, in varying weights with varying degrees and styles of steel reinforcement, according to the conditions of the job. Afford the utmost in wear and abrasion resistance.

The Safety Library

—*From page 160*

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A new safety garment reduces kiln cooling downtime before repair work at Pittsburgh Coke and Chemical Company's cement plant. H. J. Haeffner, Plant Superintendent, reports important time and dollar savings through use of the new garments.

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FEATURES

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Seams are stitched with strong chemical and heat resistant thread, then shielded and electronically welded for liquid-proof security.

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Organization

What Makes the Difference in the Effectiveness of a Safety Program. W. D. Davey. *Pulp & Paper Magazine of Canada.* Dec. 1957. p.238-242.

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ADDRESSES OF MAGAZINES MENTIONED

Readers are asked to send their requests for copies of magazine articles to the publishers, rather than to the NSC Library, which is unable to fill such orders.

American Gas Association Monthly, 420 Lexington Ave., New York 17.

American Industrial Hygiene Association Quarterly, 605 N. Michigan Ave., Chicago 11.

American Journal of Nursing, 2 Park Ave., New York 16.

American Machinist, McGraw-Hill Publishing Co., 330 W. 42nd St., New York 36.

Aviation Week, McGraw-Hill Publishing Co., 330 W. 42nd St., New York 36.

Best's Insurance News—Fire and Casualty, Alfred M. Best Co., 75 Fulton St., New York 38.

Commercial Car Journal, Chilton Co., Chestnut & 56th Sts., Philadelphia, Pa.

Edison Electric Institute Bulletin, 420 Lexington Ave., New York 17.

Fire Engineering, Case-Shepperd-Mann Dept., 305 E. 45th St., New York 17.

Hospital Management, 105 W. Adams St., Chicago 3.

Hospitals, American Hospital Association, 18 E. Division St., Chicago 10.

Industrial Medicine and Surgery, 605 N. Michigan Ave., Chicago 11.

Modern Machine Shop, Gardner Publications, 431 Main St., Cincinnati 2, Ohio.

National Provisioner, 15 W. Huron St., Chicago 10.

Pulp and Paper Magazine of Canada, Gardenville, Que., Canada.

Quarterly of the National Fire Protection Association, 60 Batterymarch St., Boston 10, Mass.

Railway Age, 30 Church St., New York 7.

Safety Standards, U. S. Bureau of Labor Statistics, Washington 25, D. C.

Women

—*From page 158*

Aprons should be full and should cover the front of the body from well below the knee to the neck. They should be fastened around the neck and waist without loose ends.

Shoes. Women's work shoes should be adequate in weight, comfortable and well-fitting—and equipped with steel toes where hazards so indicate. They should have low or medium heels — no open toes or sling-back heels. High heels on the job should be discouraged, since women usually are more susceptible to falls than men. Shoes should provide proper support.

Stockings. Right size reduces pressure and fatigue from that cause. Cotton stockings are required in certain hazardous locations, such as hospital operating rooms, where synthetic textiles may cause static sparks.

Sanitary Facilities. Important to the health and morale of women workers are clean and adequate toilet facilities, properly equipped rest rooms, locker rooms, and showers. Good seating facilities, couches, and mirrors should be provided.

Work and Pregnancy. With many married women at work, the effect of work on pregnancy involves questions of social adjustment as well as work problems. Individual cases may need specific advice and treatment.

In general, pregnant women should not be employed in jobs involving heavy lifting or other heavy work or in jobs involving continuous standing and moving about. Nor should women be employed in the following types of work during any period of pregnancy: occupations that require a good sense of bodily balance, such as work on scaffolds or stepladders; operation of power-driven machines having a point-of-operation hazard.

Although evidence indicates that non-pregnant women are no more susceptible than men to industrial poisons, some toxic substances are considered extra hazardous during pregnancy.

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the measure of fatigue... is often made with a man's two feet

Day-long foot comfort depends a good deal on the sole underfoot — a sole which should be flexible for comfort yet offer full protection against all sorts of flooring conditions.

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Lighting

—*From page 23*

light output and watts decrease, though life lengthens. If voltage is higher, light output and watts increase but life is shortened.

Voltage variation should be held within 3 volts of rated lamp voltage for 110-125-v. lamps and within 6 volts for 220-250-v. lamps.

Reflectors. Many types of reflectors are available to conserve light and prevent glare. In choosing the lighting unit consider:

—Distribution of light on the job.
—Efficiency of light output.
—Sturdiness of construction.
—Adaptability if more light is needed.
—Economy of cleaning and replacement.

Lamps with a reflecting surface inside the bulb have important advantages where dust, fumes, and other conditions make maintenance difficult or costly. The reflecting surface is sealed against deterioration and light is diffused through the bottom of the lamp.

Reflectorized lamps are available in both filament and mercury vapor types.

Natural Light

A plant may be designed to make full use of daylight or to depend largely or wholly on artificial light. The problem is primarily one of economics, taking into consideration the number of sunny days and the increased cost of construction to bring daylight into the plant.

Sawtooth roofs, oriented to avoid direct sunlight, offer the most effective way of daylighting a one-story building. Extra construction cost as compared with a flat roof, may amount to 20 per cent or more.

Side windows alone are unsatisfactory for lighting extensive areas. Skylights are rather expensive to keep in repair and clean. Upkeep may be expensive in regions where hail storms are frequent.

Refracting and **diffusing** glass are helpful in subduing glare. They improve distribution of light, particularly to distant parts of the room.

Translucent coatings for windows on the sunny side of buildings also help in reducing glare.

Reflection of daylight from sources outside a building can often be utilized. Light colors for faces of structures, walls of courts, and sawtooth roofs are helpful. These surfaces should be kept clean and free from sources of glare.

Sudden transition from bright to dim areas in a plant is hazardous. While the pupil of the eye is adjusting itself to the dimmer light there is a period of semi-blindness. Gradations of light at the approaches to areas of different intensity will avoid this trouble.

Photoelectric cells can main-

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tain an even level of light, turning on artificial lighting when illumination falls below a specified number of footcandles.

Special Fixtures

Where lighting equipment is required for special uses or subjected to abnormal conditions, many types of lamps and fixtures are available.

Glow lamps are used as signal, pilot, and night lights. They are not practical for general illumination.

Shock-resisting lamps are constructed to withstand shocks and bumps. They are used chiefly with portable fixtures on extension cords.

Vibration lamps have a more flexible tungsten filament and special support. Since vibration and shock frequently occur together, testing both lamps will tell which gives longer service.

Weather-resistant lamps are used for outdoor lighting in industrial plants, docks, athletic arenas, etc. They stand exposure to rain, sleet and snow without cracking.

Explosion-resistant fixtures are used where dusts, gases, fumes and vapors may create a hazardous atmosphere.

Infrared lamps, available in types and sizes up to 1,000 watts, are used for baking, drying and heating processes, as well as for therapeutic use.

Maintenance

Efficient lighting requires a systematic maintenance program. Equipment may meet all requirements when installed but dust and grime immediately start reducing light output.

The first step in a maintenance schedule is to check illumination periodically with a light meter. When light is decreased to 75 per cent of its original value, lamps and reflectors should be washed with warm water and a detergent containing no free alkali.

Group replacement of lamps, both filament and fluorescent, is often practicable and desirable. The saving in cost of replacing a large number of lamps at one time is greater than the value of the remaining light output of the lamps. Point of replacement is usually 60 to 80 per cent of the rated lamp life.

Disconnecting hangers permit lowering fixtures to the ground or floor for cleaning, relamping and repairs. Much climbing is eliminated.

Outdoor Lighting

Outdoor lighting for night work or to detect trespassers is required by most industrial plants. Where work is done outdoors after dark, levels must be higher than those needed chiefly for plant guards to spot intruders and detect unusual activities and conditions.

Light sources should be shielded and aimed so that the area can be seen clearly. Light can be directed to form a "glare barrage"

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in the direction from which intruders might approach the plant.

Emergency Lighting

Where power failure would endanger life, an emergency lighting system should be provided. It should be independent of the general lighting system. Exit, corridor, platform, wharf, and other locations should be included in the system so that persons could find their way out of a building.

Approved automatic devices should be installed to transfer the lighting load from general to emergency circuits in case of trouble.

Portable systems. For such emergencies as fire, explosion, accidents, or mobs, portable emergency lighting is needed. Portable wide and narrow beam floodlights with long extension cords will be helpful in rescue work and maintaining order. For use far from power sources, a power unit mounted on a truck is needed.

Standards

Lighting fixtures differ greatly in quality of materials, workmanship and lighting efficiency. To protect the buyer, the RLM Standards Institute provides recognized minimum standards of quality in lighting equipment. Equipment bearing the RLM label meets the Institute's requirements. * * *

Plastics That Protect Us

MODERN LIVING and many industrial processes have been revolutionized by the introduction of an enormous variety of moldable synthetic materials described as "plastics." Many of these have important uses in protecting the worker against accidental injury and occupational diseases.

Plastics have a wide range of characteristics. They may be transparent, translucent or opaque. They can provide tough, pliable films, or hard, shatter-resisting masses. For years they have been used for protection against the hazards of falling and flying objects, corrosive chemicals, dusts, gases, vapors, and other injurious agents.

Transparent plastic with good optical qualities is used for goggles and face shields. It can be used for corrective as well as plano goggles.

One reason for the wide use of plastics is their resistance to deteriorating agents. From hundreds of compounds, it is possible to obtain a suitable one for a particular purpose.

Most natural materials offer only limited resistance. Rubber, for example, while an excellent impermeable material for many uses, is affected by oil, sunlight, heat, and some acids. When worn next to the skin for long periods it may cause irritation.

Some untreated fabrics, such as cotton and linen, are flammable and readily affected by acids.

A plastic to meet any specific

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This photo shows a STA-SAFE Tarp at work in a large oil refinery where the constant threat of fire demands positive protection. Even after long use on outdoor welding jobs, and repeated exposure to oil, this STASAFE Tarp still gives the superior safety required. The weather has no effect on its flame resistance and oil, dirt and greases wash right off!

Regardless of the application, STA-SAFE Welding Tarps never lose their fire resistance. They last longer, cut your replacement costs to an absolute minimum.

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purpose can usually be compounded. Compounds can be made impervious to oils, acids, and most organic solvents. Some are shatter-resistant, nonconductive of electricity, and heat and cold proof. It is often possible to combine many of these properties in one compound.

Some plastics are nontoxic, odorless, and tasteless and are suitable containers for food products. They can be molded to very close tolerances, an important factor in economical production. Most of them can be produced in a wide range of colors.

Articles of safety equipment in which plastics are used include:

—Goggles and face shields
—Hard hats
—Respirators, gas and dust masks
—Garments of plastic film or coated fabric
—Containers for first aid kits
—Instruments for the dispensary

Types of Plastics

Following is a list of the more common types of plastic materials with their properties and uses:

Acrylics

Optical clarity, shatter resistance, weather resistance, machinability, wide color range.

Uses—Goggles, face shields, aircraft turrets, auto taillights, signs, brush backs. Dynel, Acrilan, Orlon textiles for work clothing.

Alkyds and Rosin Modifications

Good electrical insulation, heat resistance, dimensional stability, fast curing.

Uses—Paints, ignition parts, magneto rotors, linoleum surfacings.

Aminos (Urea and Melamine)

Good electrical insulation, resistant to organic solvents, unlimited color range.

Uses—Buttons, dishes, laminated table tops, housings for kitchen appliances.

Cellulose Plastic Materials

Toughness, high impact strength, good electrical insulation, ease of fabrication, lustrous finish.

Uses—Frames for eyeglasses, irrigation pipe, display packaging, rayon and acetate textiles.

Coumarone—Indene and Petroleum Resins

Resistance to water and caustic cleaners, compatibility with compounding ingredients, glass.

Uses—Asphalt floor tiles, waterproof coatings, aluminum paints, printing inks.

Epoxies

Excellent adhesion, resistance to chemicals and heat, can be cured at room temperatures.

Uses—Adhesives, surface coatings, transformer and motor laminates, printed circuit backing.

Fluorocarbons

Extreme resistance to solvents and corrosive agents, high impact strength, wide temperature range.

Uses—Chemical tubing, high temperature insulation, pump diaphragms.

Nylon

Good strength and toughness over wide temperature range, wear resistance, self-lubricating.

Uses—Gears, rope, brush bristles, slide fasteners, combs, nylon textiles.

Phenolic and other tar acid resins

Hard and rigid, good electrical insulation, low water absorption, good temperature range.

Uses—Protective hats, goggle frames, grinding wheels, plywood, telephone handsets, radio-TV cabinets, shell molding, dials.

Polyethylene

Inert to solvents, flexible and tough over wide temperature range, nontoxic, odorless, tasteless.

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Uses—Coaxial cables, semi-rigid kitchenware, squeeze bottles, packaging.

Polyester Resins

Weather-resistant, strong, formable with low pressure, compatible with many fillers.

Uses—Reinforced plastics for auto bodies, boats, translucent panels, Dacron textiles.

Silicones

Extreme heat resistance, good dielectric properties over wide frequency range, low water absorption.

Uses—Insulation for generator coils, circuit breakers, waterproof coatings, auto polishes.

Styrene Resins

Lightest of commercial plastics, excellent moldability, tasteless, odorless, unlimited color range.

Uses—Lighting fixtures, wall tiles, refrigerator parts, kitchenware, toys, and novelties.

Vinyl Resins

Tough and strong, excellent electrical insulation, resistance to chemicals, oil and weathering.

Uses—Floor tile, protective garments for a wide range of exposures, metal and fabric coatings, rainwear, pipe and pipe fittings, valves, electrical insulation, machine and structural parts.

Note: Data presented in this table were obtained largely from The B. F. Goodrich Co. and Bakelite Corp. The number of applications of these plastic materials could, of course, be expanded considerably.

Adopts New Radiation Exposure Limits

THE U. S. ATOMIC Energy Commission has approved for use in its facilities and those of its contractors new maximum permissible radiation exposures recommended by the National Committee on Radiation Protection and Measurement.

No appreciable modification of the Commission's present radiological safety practices will be required as a result of the new radiation exposure standards. In actual practice, the radiation exposure of nearly all of the workers in Commission facilities has been below both the new and the old levels recommended by the NCRPM. Such adjustments in present safety practices as are required will be made as soon as practicable.

The Commission action does not affect the operations of Commission licensees. Radiation exposure standards for licensees are set in a Commission regulation (Title 10, Chapter 1, Code of Federal Regulations, Part 20, *Standards for Protection Against Radiation*) which remains in effect. The Commission is currently considering amendments to this regulation to make it consistent with the new recommendations.

Most of the limits apply to occupational exposures received by workers in areas where radiation levels are monitored and controlled. A basic revision in the radiation standards recommended by the NCRPM is the inclusion of a new provision to limit the total radiation dose any individual may accumulate beyond the age of 18 to an average of 5 rems per year and not more than 15 rems in any year. (A rem, roentgen equivalent man, is a radiation dose of any ionizing radiation

Charleston Rubber Company leads the field in manufacturing superior protective products for linemen and high voltage workers. Among CHARCO products are: high voltage protective rubber gloves and sleeves, including "Flex-Saf" Contour Cuff Gloves; "Bulldog" blanket and wire clamps; "Bulldog" utility flag clamp and danger flags; "Charcote" water repellent spray; low voltage gloves; glove protectors and innerliners; canvas storage bags; danger flags; flag standards and other products for safety.

FREE 32 PAGE CATALOG OF LINEMEN'S HIGH VOLTAGE PROTECTIVE EQUIPMENT

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estimated to produce a biological effect equivalent to that produced by one roentgen of x-rays.)

The NCRPM pointed out in connection with the new provision that "changes in the accumulated maximum permissible dose are not the result of positive evidence of damage due to the use of earlier permissible dose levels, but rather are based on the desire to bring the maximum permissible dose into accord with the trends of scientific opinion.

Another basic revision in the NCRPM recommendations occurs in the permissible radiation levels for internal emitters, radioactive substances that tend to get into and remain in the human body.

In controlled areas, the maximum permissible concentrations in air and water of radioactive substances that tend either to be distributed evenly throughout the body or to be concentrated near the gonads has been reduced to one-third of the values previously specified for occupational exposures to such radioactive substances. The maximum permissible concentrations of radioactive substances that tend to be concentrated in single organs other than the gonads, such as strontium-90 in the bones, remain at the previously recommended levels.

For individuals outside of controlled areas, the maximum permissible concentration continues to be one-tenth of the recommended permissible exposures for radiation workers.

New Booklet on Hearing Protection

The third in a series of three booklets on industrial hearing conservation, designed for management level personnel, has been published by the Accident Prevention Department of Employers Mutuals of Wausau, Wis.

The booklet is based on the broad experience of Employers Mutuals' noise specialists who pioneered in this field in the firm's policyholder plants throughout the country.

Special emphasis is placed upon techniques for persuading employees to wear ear protective de-

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HEAT RESISTANT GLOVES

These gloves are not ordinary work gloves, but are made from a patented process on soft, flexible leather, impregnated with insulating and refractory materials.

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Not only do they afford protection to the hands, but many hot materials can be handled without tongs or other equipment, thus saving both time and money.

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The finest in foot protection is a pair of safety shoes, but you probably have at least one man in your plant who doesn't wear them.

For him the best compromise is StaSafe Toe Clips, impact resistant steel clips that can be permanently nailed or temporarily fastened directly to his work shoes. Lightweight and low cost StaSafe Toe Clips combine comfort with protection.

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vices through the use of various educational and psychological methods.

The booklet provides detailed information for physicians, nurses and others who may be involved in industrial hearing protection. Fitting of protective devices is also discussed in considerable detail, as Employers Mutuals specialists believe many workers are not fitted properly and thus do not have their ear canals completely obstructed to keep out hazardous sound energy.

Although published primarily for Employers Mutuals policyholders, single copies of the booklet are available free to those requesting it on their business letterhead.

Methods of Flameproofing Fabrics

In some cities and states, fabrics in public-assembly places must be flameproofed. The process also increases resistance to weather and mildew.

Pretreated textiles may be purchased or customers may send fabrics to mills for flameproofing.

Flameproofing materials are available in proprietary compounds or under chemical names. Ingredients include ammonium sulphate or phosphate, ammonium chloride, borax and boric acid. They are usually applied to the fabric in saturated solution.

Detailed information, including materials, methods of tests and standards, may be obtained from:

Textile Research Institute: *Fireproofing of Textiles.*

National Fire Protection Assn.: *Recommended Requirements for Flameproofing of Textiles.*

National Safety Council: Data Sheet D-220, *Fire Retardant Treatment for Fabrics.*

National Bureau of Standards: Circular C-455, *Flameproofing of Textiles.*

Ionizing Radiations

—*From page 8*

Tolerance Doses. Standards for the protection of atomic energy workers and the public against radiation hazards arising from activities licensed by the United States Atomic Energy Commission have been issued by the Commission.

Limits are prescribed governing exposure of workers to external radiation, concentrations of radioactive material which may be discharged into air and water, and disposal of radioactive wastes.

The standards established by this regulation (10 CFR, Part 20, "Standards for Protection Against Radiation") became effective February 28, 1957.

The standards agree substantially with those published by the National Committee on Radiation Protection in NBS Handbook 52, *Maximum Permissible Amounts of Radioisotopes in the Human Body and Maximum Permissible Concentrations in Air and Water*, and NBS Handbook 59, *Permissible Dose from External Sources of Ionizing Radiation.*

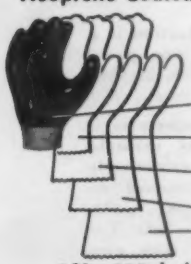
The Radiation Symbol. With the introduction and increasing use of radioactive materials, a distinctive warning symbol was devised by the AEC. It consists of a 3-bladed design in purple or magenta against a yellow background. Accompanying words describe the nature and seriousness of the exposure.

Protective Measures

Methods of keeping external radiation down to a reasonable value are:

1. Keeping personnel a sufficient distance from the source.

Neoprene Coated Flannel Stanzoil Pacemakers



Length	Style	Weight	Model
10"	Knit wrist	Light	80
10"	Knit wrist	Industrial	90
10"	Knit wrist	Heavy Duty	95
10"	Gauntlet	Industrial	100
10"	Gauntlet	Heavy Duty	105
12"	Gauntlet	Industrial	120
12"	Gauntlet	Heavy Duty	125
14½"	Gauntlet	Industrial	140
14½"	Gauntlet	Heavy Duty	145
18"	Gauntlet	Industrial	180
12"	Gauntlet	Twin lined*	225

* No. 225 designed to protect hands from extreme hot and cold temperatures.

Pylox™ Coated Jersey Stanflex

Model	Style	Size	Length
5062	Knit wrist	Men's	10"
5052	Knit wrist	Women's	10"
5232	Band top	Men's	11"
5132	Gauntlet	Men's	12"
5252	Gauntlet	Men's	14½"

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2. Shielding the source.
3. Reducing time of exposure.

The standard shielding material against x-rays and gamma rays is lead. However, it is often more convenient to use other building materials as shields, particularly with x-rays from sources of relatively low intensity, and cheaper to use other materials for shielding sources of very high intensity.

Personnel monitoring. Employees working around sources of radiation should carry personal

RADIATION symbol, purple or magenta on a yellow background, is carried on a warning tag placed on a locked door at Oak Ridge National Laboratory.

radiation monitoring devices. Types of devices include film badges, pocket chambers, pocket dosimeters, film rings, etc.

Monitoring devices are available from a number of commercial organizations which take full responsibility for reading them and providing a permanent record of the exposure received by each individual.

Laboratory monitoring. Areas and equipment are checked with an ionization type of survey meter for contamination with alpha and beta emitters and with a Geiger counter for gamma radiation. Alpha and beta emitters are especially dangerous as sources of internal radiation.

Coats, trousers, and shoes and operators' hands are monitored daily. When garments show activity beyond a specified level they must not be sent to a commercial laundry.

With these devices and procedures it is possible to determine the radiation dose to any person. Conditions can then be adjusted to keep the dosage within conservative tolerance levels.

Radioactive Wastes

A vital problem is the disposal of radioactive waste materials. One cannot assume that such materials will be sufficiently diluted if they are simply emptied down the drain. Under some circumstances burying waste products may also be highly hazardous. This would be especially dangerous if they were buried in a place where the materials could pollute underground waters leading to a public water supply.

The best solutions appear to be:

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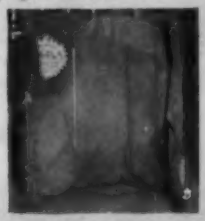

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- Inside Pocket
- Adjustable Wrist
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1. Dilute solid or liquid wastes with sufficient volumes of non-radioactive isotopes of the same element to reduce the activity below hazardous levels.

2. Concentrate the wastes to a small enough volume that they can be buried in containers, usually concrete blocks, which will erode away very slowly and thus release their activity to surrounding waters at a very low rate.

Waste products may be gases or vapors. These, if above safe levels, should be filtered or absorbed from the waste air stream and their disposal should be considered as carefully as the disposal of any other radioactive waste material.

For companies getting radioactive materials from the Atomic Energy Commission advice and instruction are available from the Commission. If the material comes from sources not under the control of the Commission, advantage should be taken of the same courses of instruction and advice which are available from several of the large university research centers.

Diary

—From page 5

safety man can. He will tell you I am right when I say, you protect yourself on buying ladders maybe 10, maybe 20 per cent by visual inspection. You look at the ladders; you have somebody who knows how to look at ladders look at them very carefully. They will see checks. They will see knots. They will see bad workmanship, if it shows on the surface.

"But 80, 90 per cent of protection is just one thing—it is knowing your supplier. No supplier is perfect, but some are good and reliable, others are not. This you have to know, with ladders, with fire extinguishers, with anything to do with people's lives. You can't test; you have to trust. And you are very slow to trust those whom you do not know."

I think Corelli was impressed.

And as we walked back to my office, Max was whistling a French tune. "There is a new French chef," he said, " in a little roadhouse by Bulesburg, who can

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sometimes be persuaded not to ruin prawns. We maybe should go and encourage him, for he is lost among barbarians who think cooking is raw steaks and overcooked potatoes."

"What about that Coast ladder outfit?" I asked.

"I do not know," he said. "The price is very beautiful. With it I could make Smith look very sick. But I do not know. I hear some things—Lucas thinks they are sound. I will go looking when I am West in May, and I will tell you something, maybe, when I see you in July."

"I asked, "What about the ladders we need now?"

"Hold back a little. Buy what you need right away from me or Smith. Let what can wait, wait. The price is very suspicious. But also very beautiful. Like prawns —so very good if right, so very, very bad if not good. That is enough about ladders. Let us now go and investigate the prawns of my expatriate friend at the roadhouse."

And so ended the business part of another visit from the odd little peddler who has, throughout my whole career as a safety man, been friend, teacher, inspector, confidant and generally invaluable aid to me. And if he has also been a little bit of a burglar on occasion, I am much ahead through knowing him despite his burglaries.

Wire from Washington

—*From page 7*

tinue allocation of funds for the automotive crash research program. This change of policy was made "largely" on the basis of a letter from Congressman Roberts that such "basic research is an invaluable contribution to future safety design of the automobile."

At the Interstate Commerce Commission's request, Senator Magnuson introduced S. 3104 to amend the Interstate Commerce Act in such a fashion as to assure the effective applicability of motor carrier safety regulation upon the some two-thirds of the private carriers and the three-quarters of the commodity carriers not now

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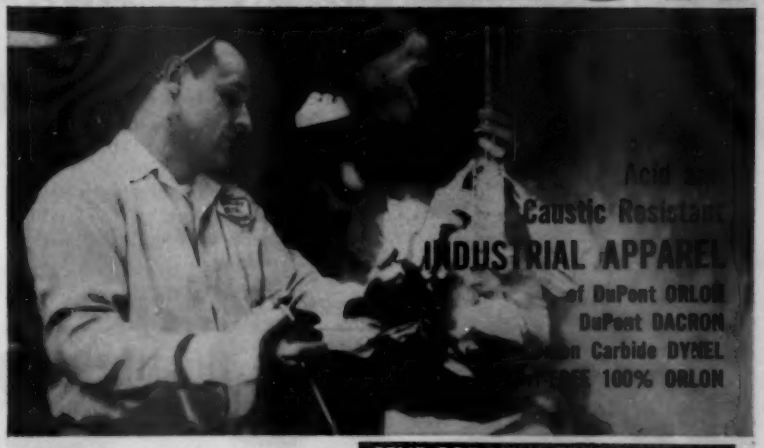

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effectively covered by such safety requirements. The Interstate Commerce Commission justified the bill as promoting better compliance and as likely to reduce accidents.

S. 3218 (Kuchel) is a new bill providing for billboard control along the Interstate Highways. In part, its sponsor justified it on safety grounds "because all too often vital route information or cautionary signs are obscured by . . . the mazes and walls of posters and billboards."

H. J. Res. 470 (Byrne) would urge the states that have not yet done so to adopt the Uniform Vehicle Code.

The U. S. Court of Claims decided a case arising from a wartime accident in which a truckload of ammunition exploded on the public highway, with resultant extensive personal injuries and property damage. Although transportation was by a common carrier, the Army itself had loaded and sealed the truck. The Court of Claims said although the government's legal liability was in doubt, the 189 claimants had an equitable claim against the United States on the basis of "the compassionate responsibility of the United States."

Aviation Safety. A special investigating committee of the Airline Pilots Association submitted an interim report stating that the nation's transport planes were carrying potentially dangerous cargoes. It laid the blame to inadequate regulations, carelessness, and ignorance of safety rules. In particular the report noted the following potential hazards: (1) loading of cargo planes in accordance with railroad safety rules which do not necessarily apply to planes; (2) inadequate design of cargo planes and questionable adequacy of fire fighting equipment; (3) non-compliance with air parcel post regulations by postal and airline personnel.

As a result of an airplane collision in California, the Senate heard a demand for a "clear, unequivocating single federal authority to control air space in the interest of the safety of those who are in the air and those who are on the ground," and the House was presented with a resolution calling for the creation of an emergency joint committee to consider changes to the Civil Aeronautics Act "for absolute control of our shrinking air space" by a federal agency, in the interests of safer air travel.

Many organizations are expressing concern over the problems of amateur experimentation with rockets and rocket fuels. In this connection, the CAA warned that amateur rocketry is becoming a new hazard to air travel and warned that all proposed launchings should be discussed in advance with its safety inspectors, as well as with local police and fire department officials.

Marine Safety. Considerable attention is being given to the proposed international conference to modernize the rules for safety of life at sea. The State Department committed itself to press for such conference in the spring of 1959. The House Committee on Merchant Marine, which has urged the holding of such a conference [see "Wire," Dec. 1957] held hearings on the government's progress for its preparation. Upon request of the State Department the Coast Guard has assumed responsibility for the U. S. Government's preparation for this conference.

The Chairman of the House Committee on Merchant Marine expressed his views on the needs in the field of small boat safety, as follows: (1) avoidance of a "hodge-podge of local, state and federal laws enacted at cross purposes without any master plan or guidance"; (2) formulation of a model state law; (3) modernization of the Motor Boat Act of 1940 and the Numbering Act of 1918; (4) carrying out the recommendations of the National Small Boat Safety Conference [see "Wire," Feb. 1958]. The Chairman promised prompt hearings on H. R. 8474, the proposed Boating Act of 1958.

Safety considerations were crucial in a 5-4 decision of the U. S. Supreme Court. A seaman lost his life on a tug due to a fire caused by violation of a Coast Guard navigation rule requiring

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lamps to be maintained at a height of no less than eight feet. Here, the open-flame kerosene lamp was at three feet, and its lowered position resulted in igniting an accumulation of flammable vapors. The employer argued that the safety regulation was intended to avoid collisions, not fires, and therefore that the normal rules of negligence applied. The Supreme Court held otherwise and ruled that the violation of such navigation safety rule brought absolute liability, without regard to negligence.

Home Safety. The Food and Drug Administration ruled that a greater margin of safety must be established for pesticide toleration in milk than in any other food item in the American diet. This consideration was basic to its ruling denying the right to market a fly spray for dairy cattle in one instance, and approving a tolerance for another chemical to be used for pre-harvest application on certain grains.

Capacitors

—From page 14

should be connected to the arrester grounding conductor as prescribed for separate installations.

74. Less arcing on opening of the cutout on combined transformer and capacitor installations will be observed than on separate capacitor installations. The primary winding of the transformer will constitute an effective discharge resistance for the capacitor so that normally no residual charge will be observed on the capacitor terminals after the circuit is opened.

75. Since there may be burned-off leads or open windings in the transformer, however, the standard procedure for short-circuiting should always be observed.

Installations at Secondary Voltage

76. In general, capacitor installations at secondary low voltage are made at transformer banks supplying power customers. In order to avoid possible harmonic

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resonance with resultant excess capacitor current and overheating, the capacitor kva should be limited to 50 per cent of the transformer bank kva, unless investigation in the specific case shows that capacitor kva greater than this amount may be safely installed.

77. Capacitors installed at transformer banks under the following conditions should ordinarily be connected directly to the secondaries (without fuses), the overcurrent protection being provided by the fuses of the supply transformers:

a. On 3-phase "Y" connected banks or single-phase transformer installations, provided that the transformer kva connected to any one fuse does not exceed 200 kva.
b. On delta-delta connected banks, provided that the transformer kva connected across any one phase does not exceed 100 kva.

78. Where the above limitations may be exceeded in capacitors installed at transformer banks, specific recommendations on the type of overcurrent protection to be used should be obtained from the proper engineering authority. These limitations are prescribed in order to limit to safe values the short circuit stresses in the individual capacitor units in case of failure.

79. The lightning arresters provided for the low voltage transformer secondaries are considered satisfactory for surge protection for the capacitors.

80. In all such installations, the capacitor mounting rack should be connected to the arrester grounding conductor by readily accessible disconnecting facilities.

ACKNOWLEDGMENT

The revision of this data sheet was prepared by M. M. Mehring, Safety Supervisor, Consumers Public Power District, Columbus, Nebraska, as a project of the Engineering Committee, Public Utilities Section, National Safety Council. It has been extensively reviewed by members of the National Safety Council and representatives of chapters of the American Society of Safety Engineers. The data sheet has been approved for publication by the Publications Committee of the Industrial Conference of the National Safety Council.

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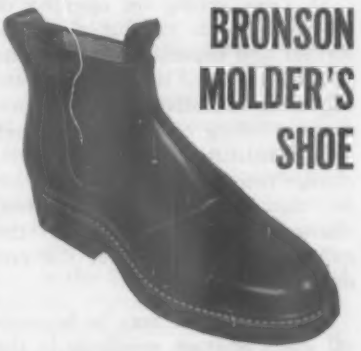

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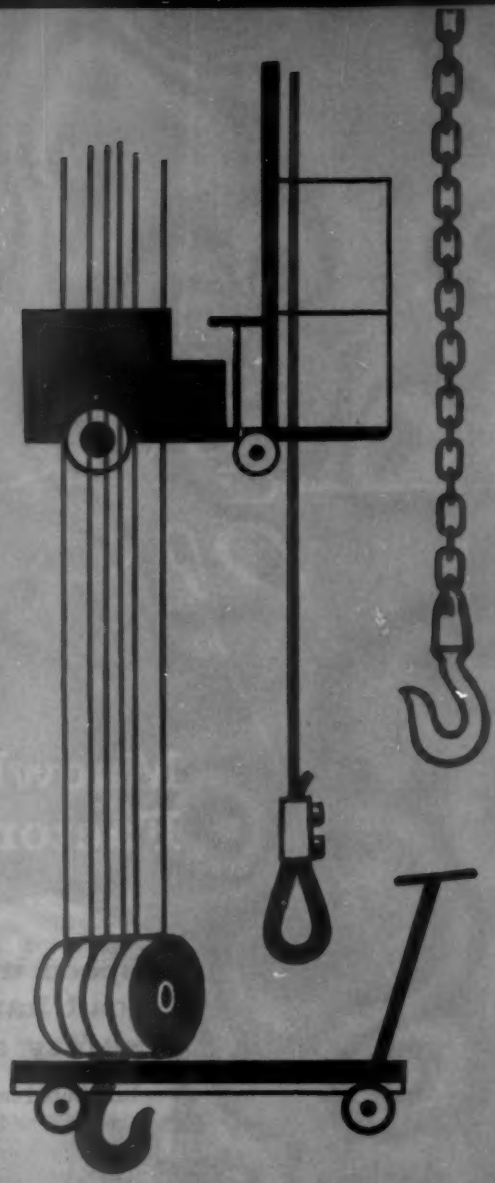
IN SECTION 7:

Analyze Materials Handling 181
Trucks and Tractors 182
Hoisting Equipment 183
Conveyors 183
Wire Rope and Slings 184
Chains and Slings 188
Fiber Rope 192
Aids to Manual Handling ..197

BY THE TIME a finished product is delivered to the consumer it has been handled many times — by producer, processor, wholesaler, retailer, and transportation agencies. Selling cost includes many man-hours of handling, also the cost of accidents that have occurred along the line.

Handling objects is involved in between 20 and 25 per cent of occupational injuries, with a high proportion of fatalities and permanent disability cases among them.

Mechanical methods avoid many of the hazards of manual handling, largely by reducing the exposure and preventing strains, blows, and abrasions. But mechanization introduces some hazards of its own. To avoid them, study plant processes and handling methods, select the right equipment, and train employees in its use.



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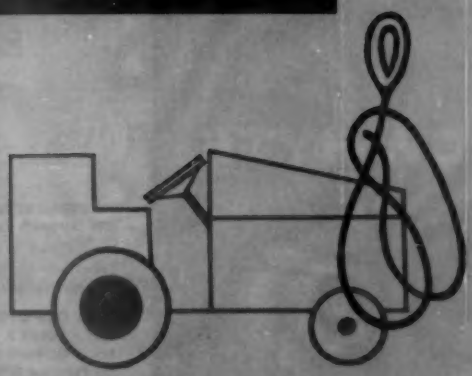
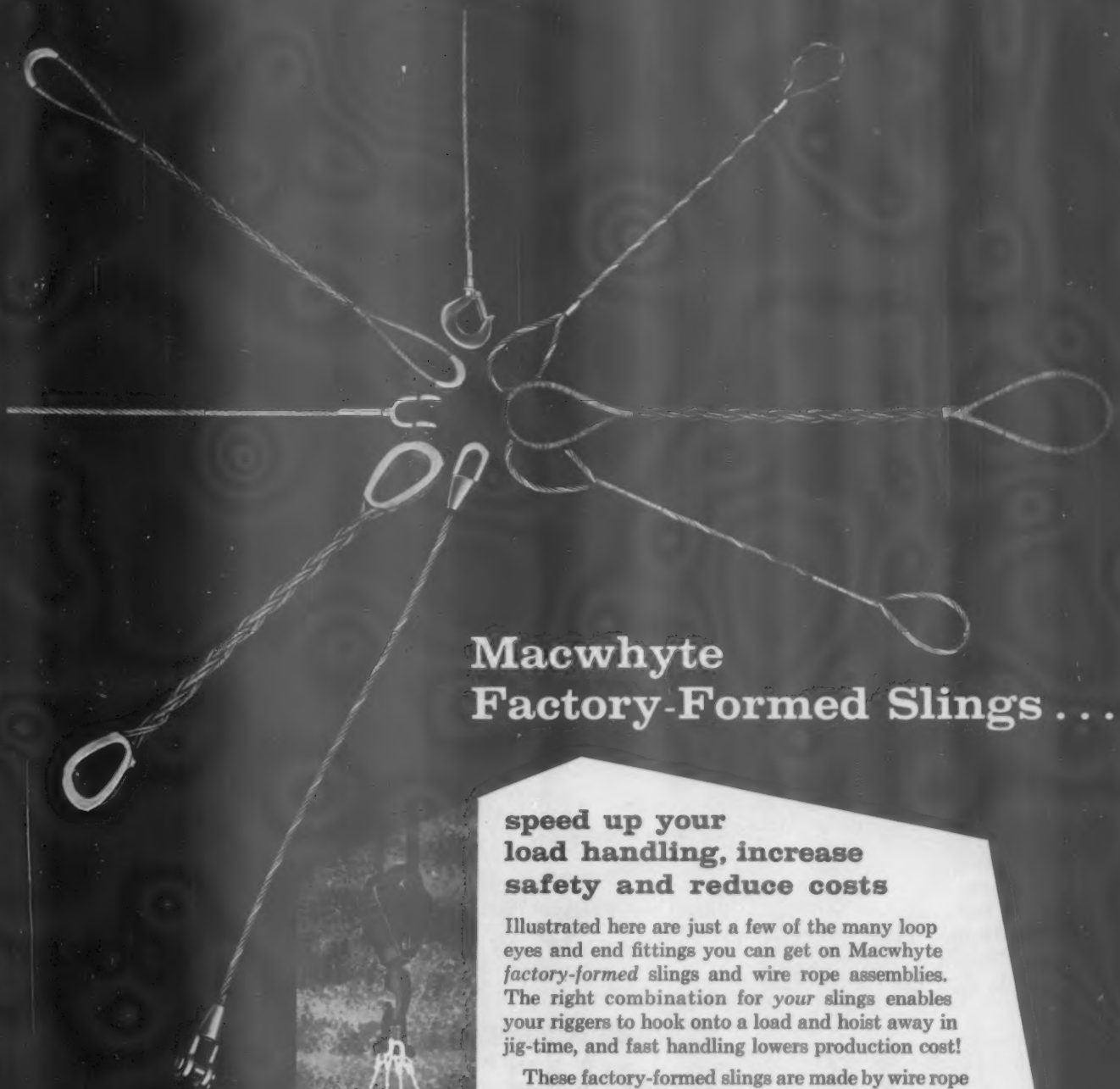
MATERIALS HANDLING





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Analyze Materials Handling

MATERIALS HANDLING is the movement of objects in the horizontal plane, in the vertical plane, or in a combination of the two. Objects vary in weight and size.

Every time an object is handled—by manual or mechanical methods—there is exposure to accident.

Safety problems include prevention of sprains, strains, back injuries, contusions, and fractures. These methods help:

1. Using mechanical handling devices where possible.
2. Training operators of equipment.
3. Training men who handle objects manually in safest and easiest methods.
4. Assigning men physically fit for such work through preemployment examinations and job studies.

Manual movement. When an object is to be moved manually, its weight is the important factor. Height to be lifted and distance to be traveled also are important. Environmental conditions may bring exposures that cannot always be predicted.

Mechanical movement. When mechanical power lifts and propels the weight, height to be lifted and distance to be traveled are the important factors. The greater the distance traveled with the load, the greater the chance of dropping it or colliding with another object.

Exposures in Manual Handling

Simple equipment is often needed for manual lifting and transporting. Training, supervision, and housekeeping will control these:

1. Incorrect lifting or carrying techniques.
2. Attempting to lift weights beyond the worker's capacity.
3. Lack of coordination among workers lifting together.
4. Cluttered aisles, floors and stairs.
5. Failure to use equipment provided.
6. Showing off.

Exposures in Mechanized Handling

Mechanized handling equipment also poses safety problems. When such devices are used, strains are minimized but falling object and collision accidents (with crushed hands and feet) may increase significantly.

Injuries from operation of mechanical devices may usually be traced to:

1. Objects falling from carrier.
2. Inadequate training of operators.
3. Faulty plant layout.
4. Horseplay.
5. Devices inadequate for the job.
6. Failure to use available equipment.
7. Poor housekeeping.
8. Excess handling between operations.

Organization for Handling

Purchase of an industrial truck or a handling device is not sufficient to bring any significant reduction in accident frequency. An organized plan should cover:

1. Study of accident occurrence.
2. Determination of location and types of accidents.
3. Inspection of conditions and study of causes of accidents.
4. Correlation of accident data and inspection findings.
5. Preparation of management report.

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HOISTS of several types on display at 1958 Plant Maintenance and Engineering Show. They were piloted around the circular monorail track by chic engineers operating stylized locomotives. (Yale and Towne)

←—Circle Item No. 139—Reader Service Card

Trucks and Tractors

WHEELED VEHICLES have been designed for every hauling job. Some also perform lifting operations. Both hand- and power-operated models keep goods flowing in factories, warehouses, docks and railroad terminals.

Power Trucks

Industrial power trucks are operated by engines using gasoline or liquefied-petroleum gas, or by storage batteries. Many trucks designed for gas have been converted to LPG.

Power trucks should comply with the power truck code specifications for fire protection. These are minimum requirements for trucks in ordinary locations. For hazardous locations requirements are much stricter.

Hazardous locations are defined by the National Electrical Code as:

Class I—Where flammable gases or vapors may be present.
Class II—Combustible dust.
Class III—Easily ignitable fibers or flyings.

The *Safety Code for Industrial Power Trucks* (ASA B56.1-1950) stipulates that electrical or gas-powered trucks may not be used in these locations unless specifically approved by the inspection authority for the location involved.

Types of trucks covered by the ASA code include high-lift, low-lift, fork, and platform high- and low-lift trucks, tractors, straddle trucks, crane trucks, powered hand trucks, and other special trucks.

Fork lift truck. This has become the most widely used power truck. It is a cantilever type, self-loading truck with vertical uprights and elevating mechanism. Fork trucks permit handling of loads on shallow double-faced pallets as well as skids. Pallets afford a wider load distribution, an advantage in tiering.

Attachments are used for handling a variety of packaged and bulk materials. Clamps permit moving cartons, bales, and drums without pallets.

Dumping attachments are used for discharging liquid, solid, and granular materials.

Canopy guards are required by code for fork trucks where the operator is exposed to danger from falling objects. The guard should be strong enough to support a capacity load and have no opening larger than the smallest package carried.

Scoop trucks shovel loose materials and elevate and dump them into hoppers and bins.

Powered hand truck. The truck, similar to a hand lift truck, is powered by a storage battery and controlled by a walking operator. A motor on the forward wheels supplies power for hauling.

A powered hand truck should have a dead-man control so brakes will be applied instantly when the operator releases the handle.

Platform truck. Used for hauling baggage, mail, and packages at railroad stations and steamship piers and in industry for some jobs where loads cannot be palletized. Loading is by hand.

Low-lift platform truck. Platform elevates just enough for horizontal movement. It picks up loaded skids, moves them and sets them down without manual handling or use of other equipment.

HIGH LEVEL maintenance with aerial platform on 3000-lb truck. Truck is equipped with remote control which permits operator to raise and lower himself to level desired.

High-lift truck. This may be a fork, platform or special type. It has a lifting mechanism to permit tiering one load on another.

Ram trucks. This type has vertical uprights and elevating mechanism like a fork truck. It is normally equipped with a single ram for picking up coils or rolls.

Roll-handling trucks for handling paper are equipped with a cable drum and two cables. Hooks on the cables hook over the ends of a rod which serves as an axle for the roll.

Crane trucks are equipped with boom, cable, and drum. Hooks, spreaders, and slings are used for moving heavy unit loads and objects too large to be handled on truck platforms or forks.

Tractors and trailers are used where large quantities of materials are moved relatively long distances, as at freight terminals and piers. Loading and unloading is done manually or by crane or other equipment.

Hand Trucks

The two-wheeled hand truck, designed for handling bags, drums, barrels, cartons, and beverage cases, comes in a variety of sizes and types. It can be equipped with brakes.

Hand platform trucks, available in several designs with capacities for 150 to 2,000 lbs., are suitable for short hauls. They usually are designed to be pushed by one of the end racks.

Hand lift trucks. The load, supported on platforms or skids, is raised enough for horizontal movement and pulled by hand power. These are useful where loads are relatively light and distances short.

Wheelbarrows are useful for hauling and dumping bulk materials. They can be used where a 2- or 4-wheeled vehicle could not be maneuvered. Bodies of aluminum and magnesium alloys, and rubber tires, have made them lighter and easier to handle. * * *

Hoisting Equipment

A HOIST is a mechanical device, suspended overhead, used for raising or lowering loads through a vertical plane.

Common types include:

1. Block and tackle.
2. Hand chain hoist.
3. Electric hoist.
4. Air-operated hoist.
5. Portable floor crane.
6. Jib crane.
7. Crabs and winches.

Block and tackle. Blocks threaded with fiber or wire rope are used for raising and lowering scaffolds, hoisting objects, and other industrial purposes.

When used to lift heavy materials or to hold loads suspended, as on heavy-duty scaffolds, wire rope is more serviceable than fiber rope. Wire rope is too stiff for manual handling and requires a winch for operating.

References—Trucks, Hoists, Cranes, Conveyors

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—Outfitting Cranes for the Automatic Factory; W. C. Bennett, Dec. 1955.
—How Safe Is That Chain Hoist? E. S. Moorhead, Feb. 1956.
—How About Hoists? B. J. Povolny, Jan. 1957.
—Guarding Overhead Lifting Devices; A. J. Ruzich, July 1957.
American Standards Assn.: Conveyors, Cableways and Related Equipment, Safety Code for, B20.1-1947.
Miscellaneous: See manuals published by manufacturers of equipment and their trade associations.

Hand chain hoists may be used where overhead cranes cannot be installed because of lack of head room. They also handle heavy pieces at machines. One hoist may handle the work at several machines.

Chain hoists may be portable, portable but permanently hooked onto a monorail trolley, or built into the trolley as an integral part.

Steel is recommended for load-sustaining parts. It withstands sudden shock better than cast iron and is lighter in weight. Chain should be welded, and of quality steel.

Each hoist should be equipped with a braking device which automatically locks the load when hoisting is stopped.

Chains and sheaves should be lubricated at intervals, depending on atmospheric conditions.

Electric hoists range in capacity from ⅛ to 20 tons, are faster than hand hoists, and less fatiguing for large loads. The light-duty hoist uses link chain for lifting. The heavy-duty hoist uses wire rope.

Electric hoists should be provided with rope or other non-conducting control cords. Each rope should be marked "hoist" or "lower." One method is to use an arrow pointing in the direction in which the load will move when the rope is pulled.

Limit stops prevent the hoist from traveling too far in case the operating handle is not released in time.

Air hoists, operating on compressed air, are used where sparks from electric equipment might be a hazard. The air hoist is limited in travel because of dependence on air lines.

Grabs, grips, and tongs of several types have been developed for use with overhead handling equipment, such as cranes, monorails, and hoists. Some can handle a variety of objects while others are more specialized.

Portable floor cranes or hoists are mounted on wheels and can be moved either by hand or under their own power. These raise and lower loads in a vertical line. They will not rotate around a fixed point.

Portable cranes are useful in plants where overhead belting or shafting prevent use of overhead cranes, and where service is not frequent enough to justify more expensive equipment.

The lifting mechanism may consist of a winch with wire rope and block, or a chain hoist, operated by hand or electric power.

Electric hoists should be grounded to prevent shock in case of short circuit.

Jib cranes lift, lower, and rotate loads within the circle covered by a rotating arm or jib upon which runs a trolley. The jib is usually supported from a wall or column. A hoist, hand-operated, air, or electric, is suspended from the trolley. A substantial stop at the end of the jib arm prevents the trolley running off. * * *

Conveyors

MASS PRODUCTION has been made possible largely by conveyor systems planned to fit manufacturing processes. Conveyors are used in assembly of articles, moving parts or materials from one machine operation to the next, moving parts through painting, drying, baking, heat treating and other processes, and from one floor to another.

Conveyors can operate under conditions where it would be dangerous or uncomfortable for men to work. They also eliminate many manual handling operations which present opportunities for injury.

A conveyor system costs more than mobile equipment but will often save money where material flows in large quantities in fixed paths.

Conveyors are divided into 7 basic types:

1. Roller
2. Belt
3. Chain
4. Cable
5. Monorail
6. Screw
7. Pneumatic

—*To page 184*

Most operations need power-driven conveyors but gravity conveyors of the chute and roller types can be used effectively where successive operations are conducted on lower floors.

Stile-type crossover bridges with handrails should be placed where needed along the conveyor line.

Overhead conveyors should have side boards along edges and at turns, also screen guards under high runs, to protect workers and equipment from falling material.

Portable conveyors, mounted on wheels or casters, can be moved where needed for short jobs. They are made in roller, belt and bucket types for handling packages and loose materials. They are used in warehouses, docks, shipping platforms, coal yards and sand and gravel pits.

Both power-driven and gravity types are available. The connecting cord should be a 4-conductor in case of 3-phase power, the fourth wire being grounded in all plugs and receptacles. The cable should be arranged so it cannot be run over by vehicles and it should be inspected frequently.

Wire Rope and Slings

WIRE ROPE has many qualities which make it suitable for heavy lifting and haulage and for supporting rigging.

It has high tensile strength and moderate flexibility and is resistant to varying weather conditions. It is available in a variety of grades, constructions, and sizes to meet every industrial requirement.

In spite of its strength and ruggedness, wire rope needs careful handling and maintenance for long, safe service. It should not be exposed to excessive heat or corrosive substances nor dragged over rough surfaces.

In selecting wire rope, consider these factors:

1. Size.
2. Construction.
3. Grade.
4. Equipment on which rope is to be used and conditions of service.
5. Handling, installation and maintenance.

Every user of wire rope should have a file of catalogs of the leading manufacturers. These are much more than catalogs. In addition to listing types available, they give much useful information on use and maintenance.

Constructions

There are many types of construction, each with its own particular advantages for certain service conditions.

In describing construction, the first numeral indicates the number of strands in the rope; the second, the number of wires in each strand.

This is followed by a term describing the geometric arrangements of wires in each strand, such as 6 x 19 Filler Wire.

The 6 x 19 construction is the most generally useful. As the number of wires per strand increases, flexibility and reserve strength increase, but ability to withstand abrasion decreases. A 6 x 7 construction has higher resistance to abrasion but less flexibility.

The core serves as a foundation for the strands. Three types of cores are used: (1) fiber, (2) independent wire rope and (3) wire strand.

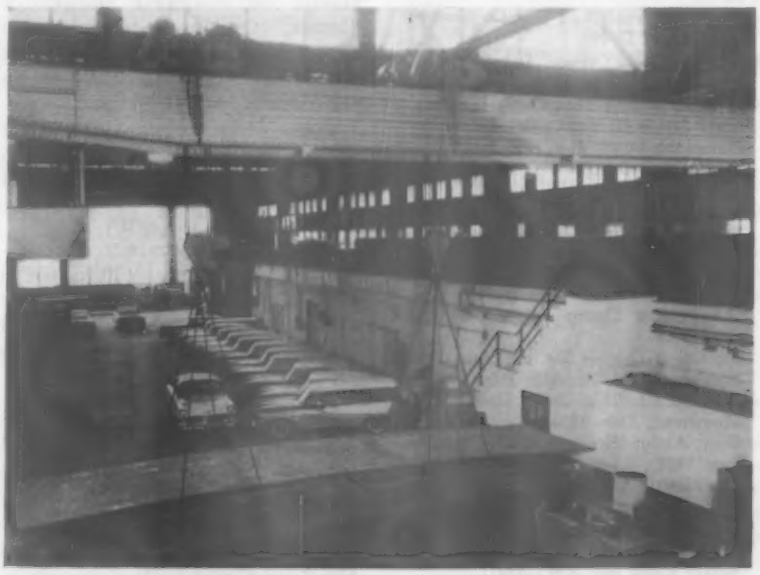
Fiber gives elasticity to the rope and has adequate strength for normal operating conditions.

Metal cores are used where maximum strength and minimum stretch are important; where heavy loads or overwinding on a drum causes excessive pressure of strands against the core, or where temperature would dry out a fiber core.

Type of lay. There are two general methods of laying up rope:

1. *Regular lay.* Wires in the strand are laid in the opposite direction to that of the strands in the rope, so that on the outside of the rope the wires lay approximately parallel to the rope axis. Regular lay is standard. It is easier to handle during installation and is less susceptible to kinking.

Lang lay. Wires and strands are laid to the same direction. It has



HANDLING heavy industrial materials at Cleveland's Reserve Terminals Co. makes severe demands on cranes, wire-rope slings, hooks and other fittings. Lifts up to 30 tons have been made.

ACCO Registered® Wire Rope Slings

Photo by Westinghouse Electric Corp.

STAND BY—Radioactive Material Below!

The safe handling of this load of radioactive material rests in the hands of irreplaceable scientists and technicians. They've been given the safest and most modern handling equipment available to do their job—including ACCO *Registered* Wire Rope Slings.

Chances are the lifting of your product does not require the services of skilled "hot lab" technicians. Nevertheless, your rigger is also a skilled technician who shares heavy responsibility in the daily production of finished products or assemblies worth thousands of dollars. He is also entitled to the best tools available for doing his job, as is any other workman in your plant.

And the best slings you can give him are ACCO *Registered* Wire Rope Slings. Each is a precision-made tool that offers the modern patented wire rope ending—DUALOC. See box at right for other features these great slings give you.

FREE 52-Page Catalog No. 9—contains helpful information about strengths, weights, dimensions—also prices—of ACCO *Registered* Wire Rope Slings. Write our Wilkes-Barre office today.

WHAT "ACCO REGISTERED" MEANS

1. The best material
2. Unit safety factor (on bodies, rings, links, hooks)
3. Proof test of complete sling to twice the working load limit
4. Actual field service test of each design
5. Metal identification tag on each sling
6. Signed Registry Certificate with each sling

AMERICAN CHAIN & CABLE COMPANY, INC.
WIRE ROPE SLING DEPARTMENT

Wilkes-Barre, Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex.
Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.
In Canada • Dominion Chain Company Ltd., Niagara Falls, Ontario

Circle Item No. 140—Reader Service Card

good flexibility and resistance to abrasion and fatigue.

Wire rope is made either right or left lay. In most cases it makes little or no difference which type is used. Right lay is standard.

Rope Grades

Rope wires usually are made of the following materials and designated by their names (Minimum tensile strengths are quoted from Federal Specifications RR-571a.):

Improved plow steel. Has highest strength and toughness and most wear-resistant properties. Most frequently selected for heavy-duty service, as in deep shafts and on excavating machinery. Minimum tensile strengths, 218,000-244,000 psi.

Plow steel. Strength about 15 per cent less than improved plow steel. Serviceable for haulage, hoisting, logging, and miscellaneous service. Minimum tensile strengths, 190,000-212,000 psi.

Mild plow steel. Combines toughness with pliability, making it capable of undergoing repeated impact stresses. Used principally for cable tool drilling. Minimum tensile strengths, 165,000-184,000 psi.

Cast steel. Where strength is not the controlling factor, its pliability is important to long life. Resistant to acid mine water. (Not listed in Federal Specifications.)

Traction steel. Used in hoisting ropes for traction-type elevators. High resistance to bending fatigue and minimum abrasive action on sheaves and drums. Minimum tensile strength, about 160,000 psi.

Iron. Low tensile strength (about 70,000 psi.) but ductile. It has been used principally in elevator service where it is being replaced by traction steel.

Corrosion-resisting metals. Where corrosion is a factor, stainless steel, bronze, and monel metal are used frequently. All-metal ropes are preferred to fiber-core ropes.

Stainless steel is used in marine operations, on aircraft, and where rope is exposed to alkali, acids of an oxidizing nature (such as nitric), neutral brine, food products, and temperatures damaging to carbon steel ropes.

Bronze is slightly stronger than iron rope. It is used frequently in marine service.

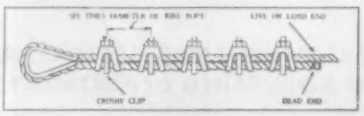
Monel metal is used where rope is exposed to marine atmospheres, acids of a reducing nature (such as sulfuric, muriatic, and hydrofluoric), neutral brines, food products, pickling solutions, and aromatic chemicals.

Corrosion-resisting ropes are furnished in complete assemblies and slings with fittings attached. Temperature, humidity, nature and concentration of corroding chemicals should be considered in selecting equipment.

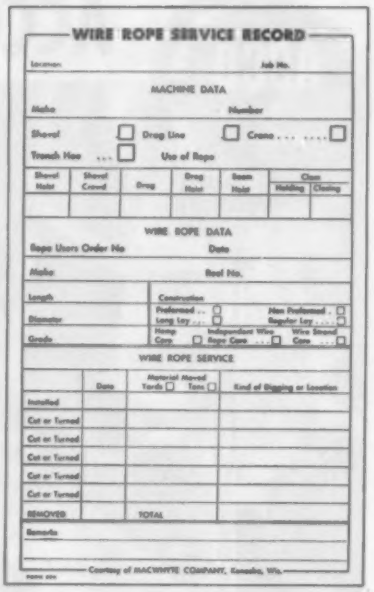
Preformed Rope

A preformed wire rope is one in which each individual strand, and at the same time each individual wire, is permanently formed into the helical shape it will assume in the finished rope. Advantages of preformed rope are:

1. Higher resistance to bending fatigue.
2. Greater flexibility.
3. Less susceptible to kinking and therefore easier to install.
4. More equal distribution of load on each strand and wire.



CROSBY wire-rope clips attached correctly. U-bolt of each clip should be on the dead end of the wire.



WIRE ROPE SERVICE RECORD

Location Job No.

MACHINE DATA

Make Number

Shovel ☐ Drag Line ☐ Crane ☐

Trench Hoe ☐ Use of Rope

Shovel Hoist	Shovel Crowd	Drag	Drag Hoist	Boom Hoist	Clam Holding	Clam Closing

WIRE ROPE DATA

Rope Users Order No. Date

Make Reel No.

Length Construction

Diameter Preformed ☐ Non Preformed ☐ Lang Lay ☐ Regular Lay ☐

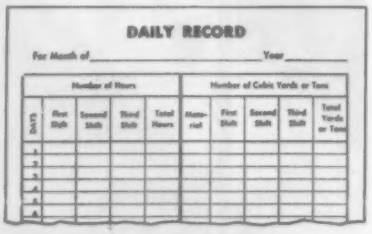
Grade Hemp Core ☐ Independent Wire Rope Core ☐ Wire Strand Core ☐

WIRE ROPE SERVICE

	Date	Material Moved Yards ☐ Tons ☐	Kind of Rigging or Location
Installed			
Cut or Turned			
Cut or Turned			
Cut or Turned			
Cut or Turned			
REMOVED		TOTAL	

Remarks

Courtesy of MACWHYTE COMPANY, Kenosha, Wis.



DAILY RECORD

For Month of Year

Date	Number of Hours: First Shift	Second Shift	Third Shift	Total Hours	Number of Cubic Yards or Tons: Material	First Shift	Second Shift	Third Shift	Total Yards or Tons
1									
2									
3									
4									
5									
6									

SERVICE RECORD CARD keeps track of wire rope performance on construction jobs. Data on daily output of machine are recorded on reverse side of card. (Macwhyte Co.)

5. More resistant to whipping and vibration.
6. Hugs small drums better and winds more uniformly and smoothly.
7. Operates over sheaves with less rotation around its axis, with less wear on rope and sheaves.
8. May be socketed with less danger of unbalancing the lay of the rope below the base of the socket.
9. Does not unravel when seizings are removed from ends of rope.
10. When outer wires break through fatigue, they do not protrude or "porcupine." This reduces risk of injury in handling.

Since broken wires are less conspicuous in preformed rope, greater care is needed in inspection. However, broken ends separate slightly, permitting detection.

Strength and other qualities are the same for preformed and non-

—*To page 194*

References—Wire Rope

National Safety Council: Recommended Loads for Wire Rope Slings; Data Sheet D-380.

—Steel Sinews; Safety Reprint Con. 5.

National Safety News: How Safe Are Your Slings? W. C. Richards, Aug. 1953.

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—Lifting Safely with Wire Rope; T. O. Aho, Nov. 1955.

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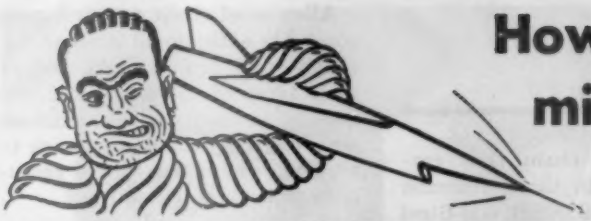
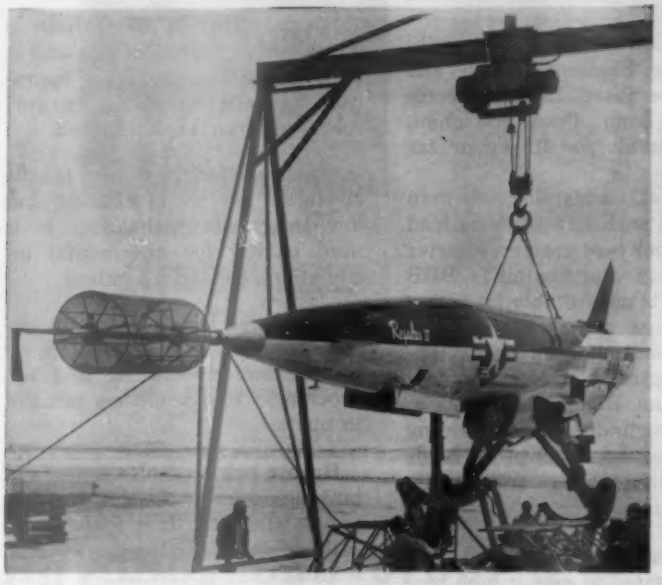


How Tuffy Slings move mighty Regulus Missiles



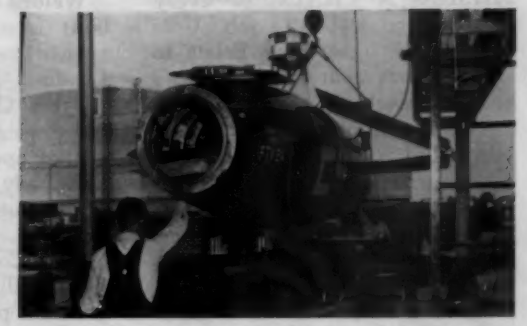
Regulus II gets a lift with Tuffy Slings. This long-range supersonic jet-powered missile is designed for launching from submarines, aircraft carriers, cruisers and shore bases. Test and training versions are equipped with landing gear so they may be recovered after each flight saving taxpayers millions of dollars.

America's intercontinental ballistic missile is still in the future, but the U. S. Navy has intercontinental assault capability today in the combination of submarine and the Regulus I and II guided missiles.

The Chance Vought Regulus I is a fully operational missile that can deliver an atomic warhead more than 500 miles, anywhere in the world. The Regulus II, soon to be operational, has already flown at supersonic speeds and altitudes of more than 50,000 feet.

As the pictures here show, Tuffy Slings are entrusted with the handling of these mighty missiles. Tuffy Slings are used all along the line of production and delivery.

The same combination of strength and flexibility that made Tuffy Slings the choice for this momentous job is yours in Tuffy Slings for every sling use. You get the same machine-braided fabric that resists kinking and from which kinks that do occur are easily removed without material damage. You get the same Tuffy pressed-on ferrule that gives the eye-splice 100% the strength of the fabric. For longer sling life, greater efficiency and safety, get in touch with your Tuffy distributor.



Tuffy helps "can" a missile: Regulus I is shown here being loaded into shipping can with Tuffy Slings. The weight of the missile is classified, but we can say that the weight of the shipping can lid, shown in lower picture, is 3,500 lbs.

Lowering Regulus I onto a submarine, Tuffy Slings are again part of the picture. The fact that such a valuable and vital weapon is entrusted to Tuffy Slings is one of the finest testimonials to Tuffy quality, dependability and safety.

Write today for your copy of
FREE TUFFY SLING HANDBOOK
Full sling data and specifications plus complete rigger's handbook.

union Wire Rope corporation
SUBSIDIARY UNC STEEL CORPORATION
2224 Manchester Ave. **Kansas City 26, Missouri**
Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand.

Circle Item No. 141—Reader Service Card

Chains and Slings

THERE'S A CHAIN for every hoisting and haulage job. Uses range from light hand hoists to huge cranes that lift industry's heaviest machines.

Chains combine strength, flexibility, and resistance to heat, impact and corrosion. These qualities are obtainable in varying degrees from a wide range of materials.

Attachments suitable for many jobs are available or complete slings may be purchased.

Specifications for various types of chain have been compiled by the American Society for Testing Materials. Safe loads may be determined from tables in manufacturers' handbooks.

Safe working load means the maximum load which should be applied to a chain in direct tension.

Breaking loads are of no practical interest to the user. They are often misleading and may encourage unsafe practices.

Proof test means the actual test in pounds applied to the chain and attachments before leaving the factory. Proof-test figures should not be considered safe working loads.

These tests are followed by visual link-by-link inspection by experienced inspectors.

Types of Chain

Conditions under which chain will operate should be considered during selection. When ordering, the manufacturer should be consulted about applications.

Factors to be considered are: impact loading, bumpy craneways, rapid lifts, sudden stops, heat, and corrosive atmospheres.

Types commonly used in industrial operations are:

Wrought iron chain (crane or dredge) has high resistance to shock fatigue and corrosion. This chain has close links and is used for slings, hoists, cranes, power shovels, and marine purposes where human life and property depend on its endurance.

Welded steel chain (low carbon) is made in three common types: Proof Coil, BBB, and Steel Loading.

Proof Coil is used principally for towing, binding, logging, and similar operations. Links are comparatively long. Proof coil chain is not suitable for lifting or for slings.

BBB Coil is a higher grade than proof coil, with safe working load about 25 per cent greater. Shorter links give greater flexibility. BBB coil chain is not suitable for lifting or for slings.

Steel loading chain has a tensile strength about 50 per cent higher than BBB. It is used in the logging industry for binding and loading logs and in oil fields for handling pipe and heavy equipment.

High-test chain (high carbon) is heat-treated to give it high tensile strength and resistance to impact loads. Tensile strength is almost double that of ordinary steel chain. Ductility is moderate. Where resistance to wear is most important, it permits use of smaller and lighter chain.

LIFTING heavy equipment is all in the day's work for chain slings.

Alloy steel chain (general purpose) has exceptional strength for weight and size, is resistant to some types of corrosion, and frequently is used where maximum tensile strength and resistance to abrasion—with reasonable resistance to impact—is required.

Special purpose alloy chain is considerably higher in cost and is used on high-temperature operations and where resistance to corrosive substances is required.

Stainless steel is high in tensile strength, fair in elongation, but low in impact resistance. It is used chiefly for ornamental installations and acid pickling.

Monel has fair tensile and impact strength and elongation. It is resistant to sulfuric and hydrochloric acid solutions but not to nitric.

Bronze has good elongation and fair resistance to impact, but low tensile strength. It is resistant to sulfuric and hydrochloric acid solutions but not to nitric.

Specialized types of chain have been developed for certain industries. Finishes sometimes are added to chains to provide added protection from corrosion or for decorative effect.

Nickel alloy steel hoisting chain is nearly twice as strong as iron chain of the same size. It meets ASTM elongation requirements for iron crane and proof coil chain. It can be used over a wider range of temperature and is relatively immune to failure resulting from fatigue stresses and cold working of the metal.

Impact resistance in heat-treated alloy steel chains does not increase in proportion to the strength of the chain. Under full working load they will fail under impact before a fully loaded wrought iron or heat-treated carbon chain will fail.

Because of wear and impact factors some manufacturers recommend that link size of sling chains should not be greatly reduced when using high-strength alloy steel chains as compared with wrought iron chain. Longer

—*To page 191*

SAFE TIME SAVER

Still handling drums one at a time? This safe, dependable Lowery Sling safely hoists up to three drums at once, saves time, money. Increased handling speed also results from ease of hitching and unhitching drums.

LOWERY BROTHERS, Inc.
9332 South Anthony Avenue
Chicago 17, Illinois
SLING ORDER FORM
INSTRUCTIONS FOR USING THIS VISUAL ORDER FORM

Anybody can order a LOWERY SLING

You don't have to be a sling expert or engineer when you use this new Copyrighted Lowery Brothers Sling Order Form. Just answer six questions on this visual order form, then draw lines between illustrations of fittings you want in places on the sling where you want them used. Lowery Brothers does the rest!

If you *are* an expert, you'll like the Sling Angle Chart, the complete listing of standard sizes of fittings used on Lowery Brothers Slings, and the rated capacity charts included right on the order form.

Write Today for New 64-page Lowery Sling Catalog and Visual Sling Order Forms

LOWERY HIGHLINE SAVES LIVES!

Light, portable hand winch, ¼-inch wire rope and clamps can be attached to car ends or hoppers quickly and easily. This unit makes it impossible for workmen to fall through bottom of car or hopper as the result of sudden load movements. Adjustable safety line hooks through safety belt, allows perfect freedom of action.

WIRE ROPE SLINGS TO LIFT ANYTHING IN THE WORLD

LOWERY BROTHERS, INC.
9332 South Anthony Ave., Chicago 17, Illinois
1372 Constance, New Orleans, La.

Circle Item No. 142—Reader Service Card

Pengo Tension Wire stringer being used by the Bechtel Corporation stringing 1,033,500 CM ACSR Curlew, Calol-filled Cable for the Southern California Edison Co., Los Angeles, California.

The latest method of stringing conductors

- ***Safest, most economical for transmission, distribution and even secondary lines.***
- ***Its greatest savings are effected when stringing over and through energized circuits . . . by far the safest, too!***
- ***Fourteen patents pending!***

Operation of the PENGO Tension Wire Stringer is almost unbelievably smooth. Because the tensioning is done on the Neoprene-Lined Bullwheels rather than on reels, conductor damage from the reels has been eliminated entirely. Due to the Neoprene lining of the Bullwheels, it is possible to use a full range of wire sizes to maximum groove capacity, which, in the case of the Model 6000-WS shown in picture, is Pheasant or 1⅜" diameter.

SMOOTH, POSITIVE CONTROL OF CONDUCTOR TENSION can be maintained at all times regardless of model or size of PENGO Tension Wire Stringer used. The large, specially designed PENGO disc brakes are mounted away from the Bullwheels to assure dissipation of the heat generated by the continuous braking action and prevent transmission of the heat to the Bullwheels.

In addition to the model shown in the picture, all series are available in low-slung trailer mounts for mountain work with separate easy-loading reel trailers.

List your requirements and send for descriptive literature and prices.

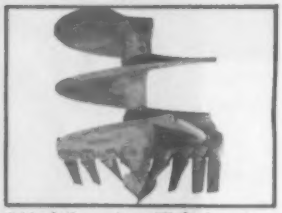
PETERSEN ENGINEERING CO.
Santa Clara, California DEPT. 8
Please send me more information on the new Pengo Tension Wire Stringer.
Name_____
Firm_____
Address_____
City_____ State_____

Made by the makers of the World-Famous
PENGO EARTH AUGERS

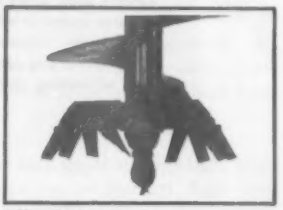
PETERSEN
ENGINEERING COMPANY
Santa Clara, Calif.

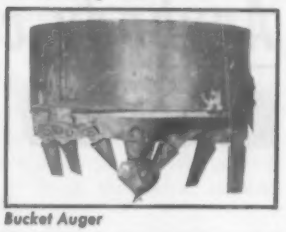
Circle Item No. 143—Reader Service Card

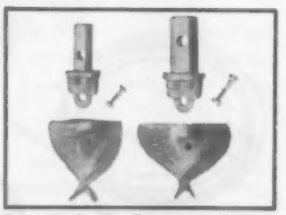
Other PENGO Products include:


24 inch Heavy Duty Flight Auger

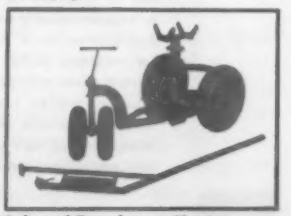
Double-Helix Heavy Duty Auger


Offset Boring Head


Bucket Auger


Screw Bit for Small Diameter Holes

Pulling Eye


Pole and Transformer Chariot

Chain

—*From page 188*

life and increased safety justify increased cost.

Use and Care

Storage. When not in use, each chain should be hung on a rack or piled neatly on a dry floor or platform where it will not create a tripping hazard. Exposure to corrosive fumes or liquids should be avoided.

Safe loads. Some plants stamp on a metal tag attached to each chain the safe vertical load which may be lifted with the chain. A better way is to stamp the safe load, or a reference number, on the ring or hook. Stamp marks should not be placed on links where they might form points of weakness.

The useful life of all material-handling equipment, particularly rope and chain, is shortened by overloading, jerking, and neglect of maintenance.

Chain Slings

Preferably, slings should be purchased complete from the manufacturer. All attachments should be made to proper dimensions and of material specified for various uses.

Rings and **hooks** are as important as the chain and should receive the same attention in inspection and maintenance.

When a sling requires repair, it should be sent to the manufacturer.

References—Chain

National Safety News: Safer Lifts; S. N. Morrison, Nov. 1950.

—Chains That Won't Let You Down; Jess Hogans, Jan. 1953.

—Watch Those Chains; July 1953.

—No Mystery About Chain Failures; N. J. Gebert, Nov. 1953.

—Inspect Those Chains; H. F. Reid, Jr., May 1954.

—How Safe Is That Chain Hoist? E. S. Moorhead, Feb. 1956.

—Eyebolts for Angle Load Safety; M. F. Biancardi, July 1956.

A hook bent by overloading should be replaced. The stress of bending weakens metal and its strength cannot be restored. * * *

Bridge Plates

Movable plates for bridging the gap between loading platforms and carriers are needed for both hand and power trucks. Bridge plates are usually of steel or lightweight magnesium or aluminum alloys.

Sides of bridge plates should be turned up at right angles to prevent trucks running over the edge. Handholds facilitate handling.

Bridge plates should have a high friction surface to prevent slipping of vehicles or persons. Plates should be designed so that when in position the ends will have substantial contact with the loading platform and the carrier to prevent rocking or sliding when in use. * * *

SAFER—STRONGER—EASIER TO OPERATE

NEWCO WIRE ROPE FITTINGS

COMBINATION CLAMP AND THIMBLE

A simple, efficient wire rope coupling which develops 85% to 95% of catalog list of wire rope strength. Affords maximum protection to wire rope — hooks, etc. Thimble will not collapse. Easy to install — can't go on wrong. U. S. Patent No. 2,600,417.

PIPE HOOK

Handle design eliminates the hazard of crushed hands . . . speeds moving of pipe. Hook can be used manually when placing pipe in position for welding or connecting. Has 1" throat opening, soft brass insert, to eliminate damaging of beveled thin wall of gas or oil pipe. Safe rate load 8500 lbs. Patent No. 175,302.

SAFETY HOOK

Fool proof, positive locking eliminates the human element of error. Load cannot be lifted without gate or yoke automatically locking. To open, the hook must be manually pressed against a compression spring. Smooth design allows full throat opening and keeps hook from catching on projections or ledges.

Combination wire rope clamp & thimble — safety hooks — choker hooks — bridles — slip-on thimbles — load protectors — open & closed thimbles— pipe hooks — pipe bridles

NEWCO manufacturing co., inc.

3636 MAIN STREET, KANSAS CITY 11, MO.

Circle Item No. 144—Reader Service Card

Fiber Rope

ROPE made of natural fibers is probably man's oldest aid for hoisting and haulage. Its uses include block and tackle work, slings, suspended scaffolds, and marine operations. For these purposes, fiber rope has two important qualities:

1. It is flexible and easy to tie and splice.
2. It can be handled manually.

Many types of fibers have been used for ropes. The best have good tensile strength and resistance to weather and abrasion.

For heavy loads where fiber rope of adequate strength would be too bulky, wire rope is more serviceable. Also, where there is exposure to heat or acid, natural fibers are short lived.

Natural Fibers

Manila is standard for tensile strength and durability. New, clean manila of good grade is hard but pliant. It is yellowish with a smooth, almost silky feel.

Sisal is the next best fiber. Strength varies from 65 to 80 per cent of manila. It is yellowish, sometimes slightly green, and lacks the gloss and smoothness of good manila. Sisal fibers are stiff and have a tendency to splinter.

Mexican sisal (henequin) lacks the strength of high-quality sisal but has been used to some extent during shortages of better grades of rope. Strength is about 60 per cent of manila.

American hemp fiber is much softer than manila. It is dark gray. It is not highly resistant to abrasion, but when tarred will give fair service on some jobs. Strength is about 80 per cent of manila.

References—Fiber Rope

National Safety Council: Sisal Rope; Data Sheet D-261.

National Safety News: Facts About Fiber Rope; June 1955.

Miscellaneous: Handbook of Rigging; W. E. Rossnagel, McGraw Hill, 1950.

Jute and cotton are not recommended for handling material or other uses where strength and durability are needed. Strength is about 50 per cent of manila.

Synthetic Fibers

Several types of synthetic fibers have been introduced in recent years. Higher cost and inherent characteristics of some materials have limited their use.

Nylon has high tensile strength, toughness, flexibility, and durability and is easy to handle.

Nylon rope has a higher tensile strength, wet or dry, than natural fibers and does not show marked deterioration when frozen. Melting at 480 F., it can be readily destroyed by fire but does not ignite. It is resistant to rot, mildew, and alkalis, but is damaged by acids and drying oils.

Glass fiber has high strength when dry, but low resistance to flexing and abrasion.

Saran resists rot and many chemicals and is practically unaffected by aging, direct sunlight and moisture. It has only moderate resistance to abrasion and temperature.

Care of Rope

Fiber rope should never be exposed to high temperatures, acid splashes, or fumes. Sharp bends should be avoided. Where a sling passes over sharp edges, pads should be used to protect the rope.

Rope should not be kept in stock for long periods. Even with careful handling and favorable storage conditions, vegetable fibers deteriorate with age. When rope is used at infrequent intervals, its age should be considered in its use and retirement.

New rope, before being placed in service, should be thoroughly inspected throughout its length. It should be uncoiled by laying the coil on the floor with inside end down; then reach down through the center of the coil and pull this end up, unwinding the coil counter-clockwise. If the rope uncoils in the wrong direction, the coil should be turned over and the end pulled out on the other side.

FIBER ROPE is favored for light hoisting operations because it is easy to handle manually and easy to splice.

Rope loaded over 75 per cent of its breaking strength will be permanently damaged. Damage can be detected by examination of inside threads, which will be broken in proportion to the overload.

Kinking is highly destructive to rope. It may cause failure when the rope is again put under strain. Kinking is more likely to occur when rope is wet.

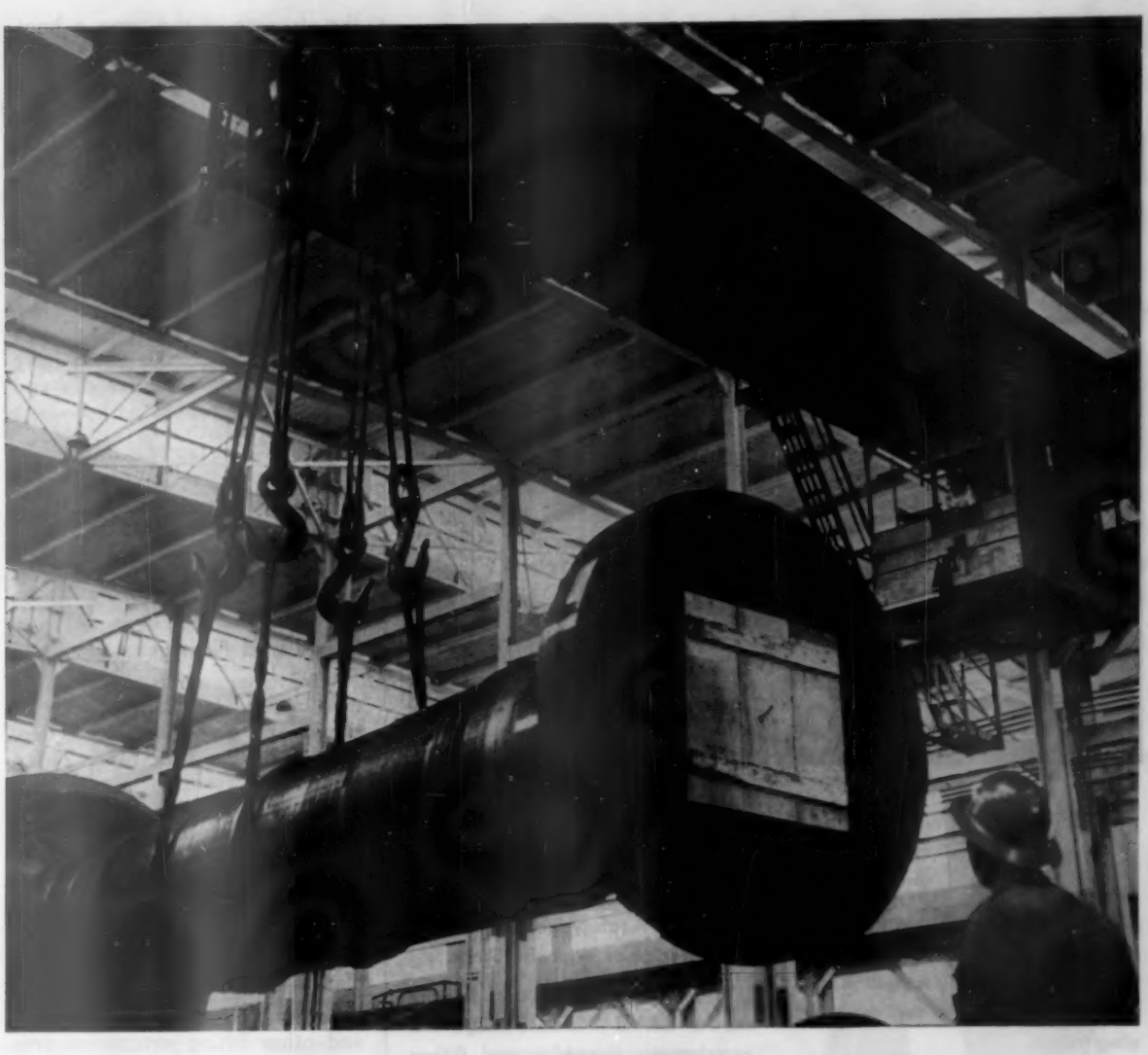
Sometimes ropes become kinked after use. One method of removing these kinks is to open up the coil and recoil left-handedly. When the coil is completed, the free end is brought through the coil and the rope is then coiled right-handedly.

Uncoiling the rope and stretching it out in a single length is another method of unkinking where space permits.

Rope should be stored in a dry place where it will not be exposed to high temperature and where air may circulate through the coils.

Rope deteriorates quickly if saturated with water and not properly dried. Alternate wetting and drying will also cause rapid deterioration.

When lengths of rope must be joined they should be spliced, not knotted. A well-made long splice will retain up to 90 per cent of



How to Lift 73 Balky Tons

The formula for a touchy lift like this would include such elements as good crane, skilled operator, well-trained floorman, and strong, flexible slings. Here the combination is seen functioning perfectly.

The load, a 73-ton forged shaft for a hydroelectric project, was not a simple one to move. Because of the problem of weight distribution, the lift was planned with unusual care. The heavy forging weighed more at one end than at the other; hence the slings around the load could not be centered exactly.

Two different types of Bethlehem slings combined to make this interesting lift. The ones suspended from the crane hook were double-part models with equalizing thimbles. Those around the forging were eight-part-braided—a highly flexible type with good gripping power. The combination made possible a lift that was well engineered in every detail.

There are so many standard Bethlehem slings available that it is easy to choose the proper hook-up for almost every load. You will find a wide range of braided, single-part, and double-part models, as well as regular grommets and all kinds of bridles. Special slings, too, can be designed and furnished quickly. Call us whenever we can aid you in making a selection.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Circle Item No. 145—Reader Service Card

sling safety
is a matter of dollars and sense

When you're lifting heavy, expensive equipment, remember that the difference in cost between a safe sling and one of inferior quality is small in comparison to the costs resulting from sling failure.

Wickwire Slings have earned the confidence of safety-minded operators. For every Wickwire Sling is subjected to rigid tests at every stage of production. A safety factor of 5 is used in the design of Wickwire Slings.

A new illustrated folder, showing the full line of Wickwire Slings, end attachments, assemblies and fittings is available from your Wickwire Rope Distributor or from our nearest sales office. Call or write for your copy today.

Certified Slings, proof-tested to loads equal to twice their rated capacity, are available at slightly higher cost.

5925

CF&I **WICKWIRE WIRE ROPE SLINGS**

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver
El Paso • Farmington (N.M.) • Fort Worth • Houston • Kansas City • Lincoln (Neb.) • Odessa (Tex.) • Oklahoma City
Phoenix • Pueblo • Salt Lake City • Tulsa • Wichita • PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland
San Francisco • San Leandro • Seattle • Spokane • WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo
Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New Orleans • New York • Philadelphia

Circle Item No. 146—Reader Service Card

the strength of the rope; a knot, only 50 per cent.

Inspection should include examination of the entire rope for wear, abrasion, broken or cut fibers, displacement of yarns or strands, discoloration, or rotting.

To inspect inner fibers, the rope should be untwisted in several places to make sure they are bright, clear and unspotted.

Rope should be replaced when it has lost its feel of pliability or stretch, or when the fibers have lost their luster and are dry and brittle. * * *

Wire Rope

—From page 186

preformed rope of the same size, grade and construction.

Slings and Fittings

Wire rope slings are widely used for heavy loads. Types of slings are grommet, single leg, two-leg bridle, 3-leg bridle, 4-leg bridle.

Legs can be single-rope, double-rope, grommet, braided single, or braided double.

Load-end fittings can be loops, links, hooks, chokers, sockets, shackles, equalizing thimbles. slip-through thimbles, plate clamps, or special.

Safety hooks on cranes, hoists and other lifting equipment prevent the load from jarring loose from the hook until the hook is unlocked manually. The latch also acts as a gauge to indicate whether the hook is sprung or not.

Complete assemblies can be obtained from manufacturers who should be consulted when slings are to be used for special purposes.

Maximum strength is obtained when all legs of the sling are vertical. The smaller the angle formed between the legs of the sling and the horizontal, the greater the tension on the legs and the less weight which can be lifted.

Where a load has sharp corners, pads or sling saddles should be placed between load and sling. Where there are sharp bends over an unyielding surface, tension on

outside strands may injure the rope.

Causes of Failure

When wire rope fails to give expected service, the reason is seldom a defect in construction of the rope. Here are some of the more common causes:

1. Use of rope of incorrect size, construction or grade.
2. Allowing rope to drag over obstacles.
3. Lack of proper lubrication.
4. Sheaves and drums of inadequate size, causing short radius bends.
5. Overwinding or cross winding on drums.
6. Sheaves and drums defective or out of alignment.
7. Ropes jumping sheave flanges.
8. Effect of heat, moisture, or acid fumes.
9. Improper fittings.
10. Permitting ropes to untwist.
11. Kinking.
12. Severe overloads, reverse bends, and other excessive stresses.
13. Internal wear caused by grit penetrating between strands and wires.

How to Order

When ordering wire rope, the following information should be furnished:

1. Length.
2. Diameter.
3. Construction—Number of strands; number of wires per strand; arrangement of wires in strand, such as Seale, Filler Wire, etc.
4. Type of Fabrication—If preformed rope is desired, it should be specified. Otherwise, nonpreformed rope will be furnished.
5. Finish—Galvanized finish should be specified if required. Otherwise, bright rope is usually furnished.
6. Grade—Improved plow steel, plow steel, iron.
7. Lay—Regular lay right lay will be furnished unless otherwise specified. Lang lay or left lay is furnished on request.
8. Core—Specify fiber core, independent wire rope core, or wire strand core.
9. Lubrication—Type of lubricant is not specified unless there are unusual service requirements. Each construction and grade of rope is treated with a lubricant adapted to that particular rope for a wide range of service conditions.

Case histories prove

TM Triple-Safe ALLOY CHAIN

increases safety,

cuts chain costs!

GAMMA RAY QUALITY CONTROL!

X-Ray type testing of master, joiner and end links assures safe, trouble-free welds.

CONTROLLED ATMOSPHERE HEAT-TREATING

on all popular sizes provides uniformity throughout the sling assembly.

EXCLUSIVE TM PATENTED TAYCO HOOKS!

I-Beam type design plus alloy steel construction mean extra safety!

Pat. No. 2,648,306

CERTIFICATE OF TEST

REGISTERED!

You get a certificate of test with every TM Alloy Chain. It bears the chain's guarantee . . . proof test . . . serial number.

Chain is our specialty, not our sideline!

TAYLOR MADE A GREAT NAME IN Chain SINCE 1873

Contact your nearest Distributor or write
S. G. TAYLOR CHAIN CO., INC.
Plants: Box 509, Hammond, Indiana
3505 Smallman St., Pittsburgh 1, Pa.

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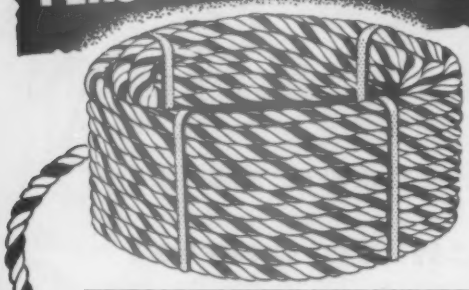
Circle Item No. 148—Reader Service Card

HIGH VISIBILITY
PLASTIC BARRIER ROPE



IPCO POLY-ROPE®

Triple strand rope of polyethylene plastic; two strands of yellow, one of black. Immediately identifies a restricted area in that it carries out the standard CAUTION colors. Tensile strength over 1200 pounds. No sag or stretch. Durability for long service life. Used and recommended by all types of industry.

WRITE FOR BULLETIN NO. 93

IPCO
Safety Equipment for all Industries
INDUSTRIAL PRODUCTS COMPANY
2850 N. FOURTH STREET • PHILADELPHIA 33, PA.

Do you have a ladder in your plant?

What industrial plant . . . no matter how large or small . . . doesn't have a ladder? Now...the Dillon Dynamometer offers a quick and easy way to check *your* ladders . . . to be *absolutely certain* the rungs are safe . . . to insure *your employees'* safety!

Ladders are but one of hundreds of types of plant equipment tested daily by safety-conscious plants with portable, lightweight Dillon Dynamometers. Available in 13 capacities from 0-500 to 0-100,000 lbs., these ruggedly constructed precision instruments are individually calibrated, protected against accidental overload, equipped with red max. pointer, unaffected by temperature . . . *unconditionally guaranteed!* Write today for price list and free literature, showing Dillon Dynamometers in action.

Inexpensive block and tackle applies load to each rung with Dynamometer interposed between. Readings are direct in pounds. Results are positive, accurate, rapid.

W. C. Dillon & COMPANY, INC.
14614 KESWICK ST., VAN NUYS 58, CALIFORNIA
(suburb of Los Angeles)

Circle Item No. 149—Reader Service Card

10. Use for which rope is intended.

Wire Rope Lubrication

All wire rope should be treated at regular intervals with a lubricant to keep it pliable and to prevent rust. Pound for pound, wire rope probably has more bearing surface (inside the rope) than any other equipment, so the importance of lubricating is obvious.

Idle wire ropes are most susceptible to rust. It is important that they are well lubricated when not in service.

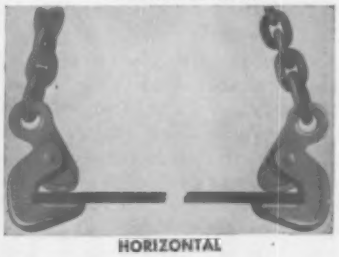
The best lubricants are those furnished by manufacturers and dealers especially for lubricating wire rope.

Lubricants which meet specifications are free from acids and corrosives and have penetrating qualities. They do not cake, gum, or ball-up if contaminated with dirt or metal particles.

Lubricant may be applied with a brush. It should be brushed on slowly, carefully and frequently because it is difficult to get complete coverage and penetration.

NEVER SLIP CLAMPS

Hold their own for SIMPLICITY of OPERATION, STRENGTH, SPEED, BUT MOST OF ALL FOR SAFETY!



HORIZONTAL

VERTICAL

Operators the world over prefer NEVER - SLIP clamps because:

- There are no enclosed parts.
- Clamps adjust automatically by strong cam action to any plate thickness.
- The heavier the load, the harder the grip.
- Holding surfaces are hardened and serrated for longer wear and efficiency.

"For Better Materials Handling"
NEVER-SLIP SAFETY CLAMP DIVISION
KENSICO Manufacturing Co., Inc.
RAILROAD AVE. MT. KISCO, N.Y.

Circle Item No. 223—Reader Service Card

A more effective method is a simple three-sheave trough. It should be firmly fixed near the reel or drum and the rope run through the lubricant not faster than 30 ft. a minute. * * *

Aids to Manual Handling

AUTOMATION and mechanization have eliminated much hand labor but not the need for human skill and strength. Materials handling is one example. There are still operations where loads are relatively light and handling infrequent, or mechanized equipment is not practicable.

Human muscles, however, can be reinforced by many types of nonpowered equipment which increase their capacity and lessen the risk of strain.

The simplicity and lower cost of this equipment sometimes lead to neglect. In the interests of safety, economy, and efficiency, it should be kept in good condition and used correctly. The condition of each item should be shown on the maintenance records.

Hand trucks, wheelbarrows, and **dollies** are on the borderline between mechanical and manual equipment. They are durable and uncomplicated but need regular servicing. Axles should be kept well lubricated.

Hooks are used for handling logs, lumber, crates, boxes, and barrels where the object will not be damaged. Hooks should be inspected daily and kept sharp. If a hook is carried in the belt, the point should be covered. The worker should be trained to use the hook so that it will not glance off hard objects.

Bars. The point or edge of a crowbar should be kept sharp and position of hand and body should minimize the chance of pinching or falling if the bar should slip or the object move suddenly.

Car movers, not crowbars, should be used to move cars on

Circle Item No. 150—Reader Service Card

One man does it all with
MORSE *Barrel-Lift*

All five drum handling operations—raising, transporting, rotating, tilting and draining—are a one-man job with Morse Barrel-Lift. Keeps 55-gallon steel drums under full control. You save on spilling, overflowing, leakage, damage to drums and accidents. All steel welded construction.

Model 80

Won't tip, Won't spill, Won't leak
Move your drums the
MORSE *Drum-Karrier* way

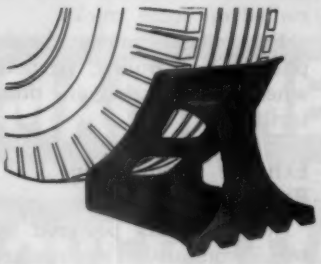
The Morse Drum-Karrier Model 85 fits all standard drums, permits one-man operation, is instantly removable from hoist hook. Positive tilt lock holds drum in position. Welded, all-steel construction; accommodates standard double chine steel drums 23" diameter, 36" height.

You Can Move It Better With Morse — for full information, write today!

Model 85

MORSE MANUFACTURING CO. INC.
765 W. Manlius St., E. Syracuse, N. Y.

ANCHOR your Truck Fleet!



CASTEEL

HEAVY DUTY
WB 15
Wheel Blocks

. . . hold SAFELY on any surface

The wide face area accommodates large tires. The broad flat base gives stability in soft terrain. Five ¾" angular calks, cast in rear of base, hold securely on ice, snow or concrete.

Sturdy brace supports are provided with a cast-in hole for chain or hook connection.

For other sizes and types of Safety Wheel Blocks, send for our Bulletin No. N-58.

CALUMET STEEL CASTINGS CORP.
1036 SUMMER STREET HAMMOND INDIANA

Circle Item No. 151—Reader Service Card

Magcoa DOCKBOARDS For Safety

Magcoa Dockboards with Special Locks

No slips, no strains, no injuries!

- Special locks prevent any Dockboard slippage—regardless of conditions
- Safety curbs end danger of equipment run-offs
- Heavy-duty safety tread prevents skidding accidents
- Lightweight magnesium (¼ weight of steel) means one-man, no-strain lifting
- Indented, safety hand holds end danger of crushed fingers or hands
- Magcoa Dockboards—the safest buy for any dock

For full details use the coupon below.

MAGNESIUM COMPANY OF AMERICA Materials Handling Div.
magcoa East Chicago 4, Indiana
Representatives in principal cities

☐ Please send special Dockboard File and news on new safety lock

Name and Title_____
Company_____
Address_____
City-Zone-State_____

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Circle Item No. 152—Reader Service Card

steel rails. When two men are needed, two car movers should be used. The same mover should not be used by more than one man.

Rollers are used for moving heavy, bulky objects. A sledge or bar, not hands or feet, should be used to move rollers under loads.

Use of Hand Trucks

The type of truck most suitable for the work should be used. No one type of truck is suitable for handling all types of loads.

On a two-wheeled truck, the load's center of gravity should be placed well forward so that the weight lies on the axle and not on the handles. Some two-wheeled trucks have brakes so the worker need not hold the truck with a foot on the wheel or axle.

Knuckle guards on two-wheeled trucks and wheelbarrows protect hands from jamming against obstructions.

Tongues of flat trucks may be provided with counterweights, springs, or hooks to hold them vertical when not in use. Otherwise, workers should be trained to leave handles in a position that will not create a tripping hazard.

To protect feet, wheels should be as far under the truck as possible. Wheel guards may be installed on some trucks.

Four-wheel trucks should be pushed, not pulled, particularly when the truck is going down an incline.

Exhaust Purifiers for Power Trucks

Where trucks powered by internal combustion engines are operated in confined spaces, carbon monoxide is a problem. Use of catalytic exhaust on trucks permits operation indoors where there is good ventilation. Types of exhaust purifiers are available for white (unleaded) gasoline, liquefied petroleum gas, leaded gas, and diesel fuel.

Preventive maintenance of trucks keeps down carbon monoxide in the exhaust. This includes a frequent check of the carburetor, since too rich a mixture can produce excessive quantities of the gas.

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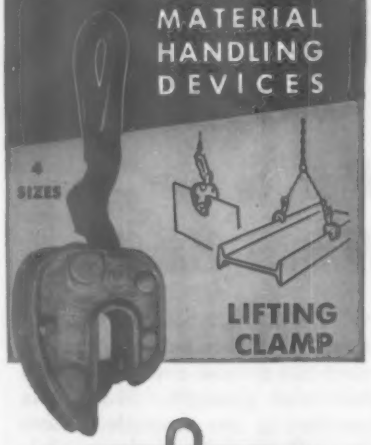

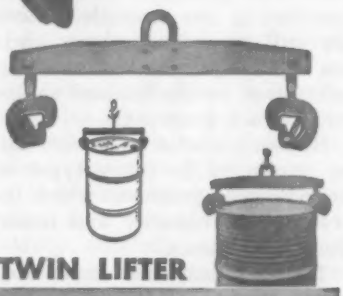

For Interesting Information write

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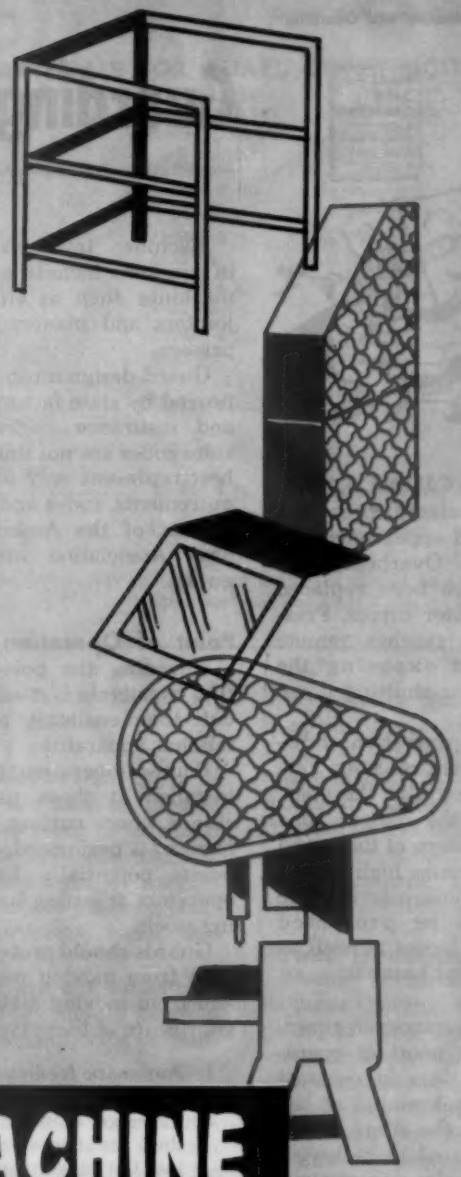
IN SECTION 8:

Guarding the Machine 200
Electrical Equipment 205
Hand and Power Tools 206

8

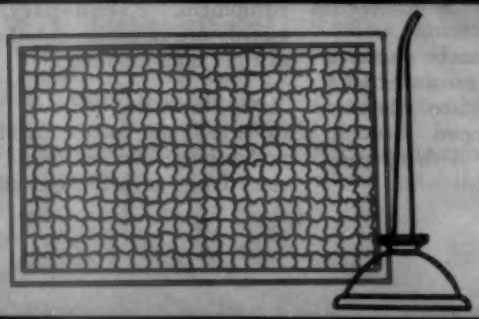


THERE ARE FEW machines and processes that cannot be safeguarded. But the realistic safety engineer knows that a guard must not interfere with production. If output is seriously reduced, the problem hasn't been solved.

Modern machines have a high degree of built-in safety. Moving parts are enclosed and automatic pressure lubrication keeps the oiler out of danger. There are push-button controls and functional use of color. Electronic and radioactive devices, still limited in their applications, offer interesting possibilities. Automation, with many automatic operations and remote control, will also influence the accident picture in many industries.

Safeguarding machinery involves far more than keeping moving parts under cover. It includes electric power and its controls, and the hand and portable power tools that keep plant and equipment in operating condition.

MACHINE OPERATION and GUARDING



Guarding the Machine

MODERN MACHINES, with moving parts enclosed, present a trim, streamlined appearance and are much safer. Overhead belts and shafting have been replaced by individual motor drives. Pressure lubrication reaches remote bearings without exposing the oiler to hazard or shutting down the machine.

The point of operation, however, still presents problems. Few operations now require the operator's hands in the danger zone but they do get there at times and machinery still ranks high among the causes of serious injuries. The individual must be protected against his own lapses as well as against mechanical hazards.

Color is an important safeguard. Highlighting the point of operation with light tints in contrast to the darker background of the machine reduces the effort of seeing. Guards painted in high-visibility colors are also conspicuous when missing.

Standard guards for many types of machines are on the market. These are often installed on older machines, on newer ones where built-in guards have not been provided, or where specially made guards are needed. For power presses, circular saws, and other machines, many types of guards are available.

A guard should not restrict production seriously. If it does, it will not be popular with either operator or management.

Some operations can be guarded effectively with commercial guards. Others require custom-built guards developed through study of the job by both operating and safety departments.

Machines involved frequently in accidents include woodworking machines such as circular saws, jointers and planers, and power presses.

Guard design must often be approved by state factory inspectors and insurance engineers. Since state codes are not uniform and at best represent only minimum requirements, codes and recommendations of the American Standards Association are the best guides.

Point of Operation

Guarding the point of operation effectively is much more difficult than enclosing power-transmission apparatus.

Point-of-operation guards are installed at those parts of machines where cutting, shaping, or forming is performed, and at other points potentially hazardous to operators inserting or manipulating stock.

Guards should protect operators both from moving machine parts and from moving materials. Safeguards are of these types:

1. Automatic feeding and ejecting.
2. Two-hand control.
3. Redesign of machine parts so that the operator cannot get into the danger zone.
4. Devices that stop machines by electronic devices while any part of the body is in the danger zone.
5. Devices that pull or push hands away from the danger zone.
6. Barricades, covers, hood guards, and other enclosures.
7. Quick-acting brakes operated by contact of the body.
8. Interlocking devices.

Hood enclosures and cover guards are used on woodworking machines and other types of equipment. Frequently, such guards are automatic. Others are of rigid construction.

Nip hazards, such as rubber mills, calender rolls, dough brakes, and others, can be protected by sensitively adjusted controls that operate dynamic brakes when contacted by any part of the operator's body. These guards stop the machine quickly.

Two-hand controls frequently are installed on power presses, bakery machinery, guillotine paper cutters, and other types of equipment where barrier guards are not practicable.

Interlocking devices prevent operation of the starting control when the cover or barricade is not in place. These are used on centrifugal extractors, dough mixers, tumblers, and some types of pressure vessels.

Power Presses

Safeguarding power-press operations is one of industry's major accident-prevention problems. Because of the many types of presses and specialized operations performed, the subject is highly complicated. Material on press operation is available from the National Safety Council, American Standards Association, U. S. Department of Labor, insurance companies, and consulting engineers.

Automatic feed makes it unnecessary (but not impossible) for an operator to place his hand between punch and die. It is still necessary to provide a gate guard, enclose the ram, or limit its stroke to ¼ in. or less.

For some operations, semiautomatic feeds are used. Principal types are: chute, plunger, slide or push, sliding dies, dial, and revolving dies.

Two commercial guards adaptable to many operations are the sweep and pull-back types.

Sweep guards are best used on small presses. They are easily adjusted and give the same protection when the clutch fails as they do for a regular stroke of the press.

A flag of fiber or other material placed on the sweep arm helps to prevent an operator reaching

around the guard on one side, and on slow-moving presses, from putting his hand between punch and die after the guard has swept past the center of the stroke.

Sweep guards are not effective on large presses.

Pull-back guards forcibly remove the operator's hands from the point of operation if he is out of rhythm with the machine. Cables connect the ram with wristlets on the operator's arms. As the ram descends, the hands are forcibly withdrawn.

The guard must be adjusted to each operator and each job because of variations in arms, hands and fingers.

Die design. On punch and forming presses it is frequently necessary to install guards of a different type for each set of dies used. For this reason, enclosure guards should always be considered integral parts of the dies.

Feeding tools. Several types of feeding tools are used on presses with automatic feeds or enclosed guards. These tools are made of soft metal, aluminum, or magnesium. They include pushers, pickers, pliers, tweezers, forks, and suction disks.

These tools are not substitutes for guards. They should be used only with two-hand trips or pull-back guards.

Electronic guards. The photoelectric relay consists of a beam of light. When this is broken by the operator's hands, the start or completion of the ram stroke is prevented. The relay responds instantaneously, is automatic, takes up little space, is easily installed and economical to maintain. Its disadvantages are comparatively high installation cost and limited uses.

On presses with friction clutches, the ram travel stops immediately when the light beam is broken. This method is not effective on presses with positive clutches because the ram will continue its stroke until the end of its cycle. The guard should be operated from a closed electric circuit so that current interruption will automatically prevent the press from tripping.

Radioactive guards have been used on some power-press operations. The operator wears radioactive wrist bands. When his hands are in the protected area, the radioactive units are detected by Geiger tubes, and the press will not operate. Radioactive materials are within safe limits.

Power Transmission

Power transmission apparatus includes shafting, belting, pulleys, gears, starting and stopping devices, and other moving parts of equipment used in the mechanical transmission of power. Also included are prime movers, intermediate equipment, and other machines.

Power transmission parts, particularly in modern installations, contribute relatively few injuries. Nevertheless they can cause permanent disabling injuries and should not be neglected.

Individual motor drives and modern designs with moving parts enclosed have eliminated much guarding on the job. However, some guards still must be added when machines are installed.

Materials for Guards

Sheet metal, perforated metal, expanded metal, heavy wire mesh, or **bar stock** may be used for most types of guards.

Transparent plastic is used where inspection of moving parts

MATERIALS FOR GUARD CONSTRUCTION

Material	Clearance from moving part at all points	Largest mesh opening allowable	Minimum gauge (U. S. Standard)
Woven wire	Under 4 in.	½ in.	No. 16
	4-15 in.	2 in.	No. 12
Expanded Metal	Under 4 in.	½ in.	No. 18
	4-15 in.	2 in.	No. 13
Perforated metal	Under 4 in.	½ in.	No. 20
	4-15 in.	2 in.	No. 14
Sheet metal	Under 4 in.	.....	No. 22
	4-15 in.	.....	No. 22
Wood or metal strip crossed	Under 4 in.	½ in.	Wood ¾ in., metal No. 16
	4-15 in.	2 in.	Wood ¾ in., metal No. 16
Wood or metal strip not crossed	Under 4 in.	½-in. width	Wood ¾ in., metal No. 16
	Under 4 in.	1-in. width	Wood ¾ in., metal No. 16
Solid wood	If plywood is used it should be not less than ⅜ in. thick and not less than 3 ply.		

References—Machine Guards

National Safety Council: Accident Prevention Manual for Industrial Operations, 1955.
—Inspection and Maintenance of Power Presses; Data Sheet D-224.
—Individual Die Guards and Adjustable Press Barriers; Data Sheet D-Me-27.
—Press Brakes; Data Sheet D-Me-28.
—The Radial Saw; Data Sheet D-353. (See complete list of Data Sheets for information on guarding various types of machines.)

National Safety News: Punch Presses Can Be Guarded; R. F. Thuma, Jan. 1950.
—Taming the Saw; L. H. Reineke, July 1950.
—Radioactive Press Guards; James H. Leacock, Aug. 1953.
—Electronics in Plant Operation; W. A. Black, Jan. 1954.
—Build Them Yourself; F. P. Hutchinson, Feb. 1955.
—The Modern Approach to Machine Guarding; George W. Bowen, Jan. 1956.
—Analyze the Job for Effective Guarding; Anders V. Thoren, Nov. 1956.

American Standards Assn.: Mechanical Power Transmission Apparatus, Safety Code for; B15-1953.
—Compressed Air Machinery and Equipment, Safety Code for; B19-1938.
—Power Presses and Foot and Hand Presses, Safety Code for; B11.1-1948.
—Woodworking Machinery, Safety Code for; O1.1-1954.

MECHANICAL APPARATUS INSPECTION

Check the points listed below. Make recommendations to cover unsatisfactory conditions so that they can be corrected promptly.

	OK
POWER TRANSMISSION ENCLOSURES OR GUARD RAILS	
Pulleys, flywheels	☐
Gears, sprockets, chains	☐
Belts: vertical, horizontal	☐
overhead horizontal	☐
Belt shifters	☐
Keys, setscrews, collars, couplings	☐
Shafting	☐
Clutches	☐
Lubrication facilities	☐
CONTROLS	
Electrical starting devices	☐
Lockout devices	☐
Tripping devices: foot, hand	☐
POINT OF OPERATION GUARDS	
In place	☐
Condition satisfactory	☐
Correct adjustment	☐

SAFETY Instruction Card No. 778.

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is necessary and the strength of metal is not needed.

Shatter-proof glass is used in similar situations, particularly where illumination of guarded parts is essential and the flexibility of plastic is not required.

Where flying particles may mar safety glass or plastic the surface may be protected by replaceable glass covers.

Wooden guards are relatively low in strength but are sometimes used where splashes and fumes from corrosive substances would attack iron or steel.

Aluminum or other soft metals may be used where resistance to rust is essential, or where machinery may be damaged by iron or steel.

Supervision

Frequent checks should be made to see that instructions are observed and that safety devices are functioning.

Operators occasionally make safety devices ineffective in an attempt to speed up production or make operation easier. This is especially frequent with two-hand controls. Operators should be warned of the hazards involved and instructed in the use of safety devices. * * *

Woodworking Machines

Circular Saw. The circular saw is one of the most useful of woodworking power tools—and one of the most dangerous. It causes more permanent disabilities than any other machine in the industry and among do-it-yourself fans.

Rim speed of a circular saw should not exceed 12,000 fpm, unless the saw has been manufactured or hammered for a higher speed and is so marked. At high speed, the teeth are almost invisible.

Following are important points in guarding:

1. Saw must be equipped with a hood that will cover it to at least the depth of the teeth.
2. Hood must automatically adjust itself to thickness of material being cut and remain in contact with it, unless in a fixed position. Then space between bottom of guard and material must be no more than ½ in.
3. Exposed parts of saw blade under table must be guarded.
4. There should be a clear view of saw at point of operation.
5. Guards should be designed and constructed to avoid vibration.
6. All teeth should be even in length.
7. Blade should not be lumpy or warped.
8. Depth, size, and shape of gullets should be such as to let sawdust discharge freely. Bottom of the gullet should be round.
9. Cut in wood should be a trifle wider than thickness of saw blade.
10. Saw must be discarded if it has a crack longer than 5 per cent of diameter, unless diameter is reduced to eliminate crack and tension is corrected.

"Harwith! That's a conveyor, not an escalator!"

Swing Cut-Off Saws. Swing cut-off saws must have device to return the saw automatically to back of table when released at any point. Fiber rope or cord must not be used in device.

Limit chains, positive stops or table extensions must be provided to prevent saw from swinging beyond front edge of table.

Where it is possible to pass behind a swing cutoff saw, rear of saw must be completely housed when saw is in back position. Housing must include swing frame as well as saw.

Manual-Feed Ripsaw. A splitter or spreader must be provided to prevent pinching or binding. It must be slightly thinner than the saw kerf and slightly thicker than the saw disc.

Antikickback devices of steel should be designed and installed so as to be effective for material of all thicknesses. * * *

Safety Applications of Photoelectric Cells

1. Protection of machine operators; Guards for power presses and similar machines.

2. Protection of plant and personnel by detection of:
(a) Flame failure on oil- and gas-burning furnaces.
(b) Poisonous gases; measurement of dust contamination in atmosphere.
(c) Smoke or flame.

3. Protection of machinery against damage by:
(a) Switching off power should work become jammed.
(b) Declutching forging presses when object is below working temperature.

4. Alarm devices for protection of property and personnel:
(a) Protection against high-voltage test equipment.
(b) Over-run on cranes.
(c) Height gauge for loaded vehicles.
(d) Burglary and trespassing.

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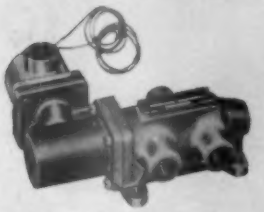


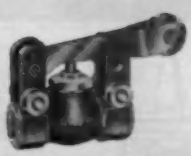
Solenoid-Operated Valve

Rotor Type Valve

Cam-Operated Valves

Flow Control Valves

Quick Exhaust Valves



Two- and Three-Way Poppet Type Valves with Roller Lever

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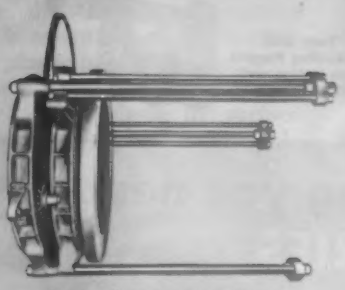

Thermal Expansion Type

Linear expansion of the thermal tubes frees the goggle plate for swinging to open or closed position. The contraction of the tubes clamps the plate, forming a gas-tight seal. Sizes: 36" to 120".

Mechanical Type

Powerful clamping force applied at all points around disc periphery provides a safe seal for gas mains from 6" to 84".

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Circle Item No. 155—Reader Service Card

Electrical Equipment

Keeping current at work under cover

ELECTRICITY has been harnessed for less than a century yet it now dominates our whole way of life. Light, industrial operation, transportation, and communication now depend on uninterrupted electric power. It has made factories cleaner, safer, and vastly more efficient.

The world's demand for power will continue to grow. Looking forward to the time when fossil fuels will be inadequate, the atomic power plant is entering the picture.

Electricity serves us with a high degree of safety. It can be controlled by modern utilization and protective equipment but safety requires constant vigilance and careful maintenance of all apparatus.

Rules for use of electric equipment are found in the *National Electrical Safety Code*, which deals with accident prevention, and in the *National Electrical Code* which is concerned with fire protection.

Electrical equipment bearing the approval label of a recognized testing laboratory can be purchased with confidence. It has passed brutal tests and labeled products are reexamined periodically.

Installation. All electrical work should comply with applicable codes.

Transformers, control boards, starting rheostats and other apparatus should be placed where there is the least danger of accidental contact with energized conductors. All exposed current-carrying parts should be further protected by enclosures, railings or special guards.

Motors should be mounted so they won't interfere with normal plant traffic. Non-enclosed-type motors should be located in areas relatively free from dust, moisture or corrosive vapors.

Isolating equipment. Transformers, control boards and other accessories should be placed in special rooms to which only authorized persons have access.

If a separate room is not feasible, enclosures should be built around equipment having exposed conductors. Metal enclosures should be effectively grounded.

Barriers may be used to prevent accidental contact with electrical equipment. Frames may be made of wood, rolled metal shapes, angle iron, or pipe. Filler may be of woodstrips, sheet metal, perforated metal, expanded metal, wire mesh, or shatter-proof transparent material.

Some protection can be obtained by elevating wires and current-carrying parts at least 8 ft. above any working level to which employees (other than qualified electricians) have access.

Where long metal parts, such as rods, bars, and pipes are handled, partial enclosures or barriers should be provided to prevent contact with overhead electrical installations.

Warning signs should be displayed near exposed current-carrying parts, especially high-voltage installations.

Many standard machine-guarding practices apply to electric equipment, but there are certain hazards peculiar to electricity. Particular attention should be given to the *National Electrical Safety Code* and the *National Electrical Code.*

Protective grounding is necessary for exposed non-current-carrying metal parts if the equipment is supplied by means of metal-clad wiring, when installed in a wet location, and when it operates with any terminal at more than 150 volts to ground.

Parts to be grounded include motor frames, cranes, cases of transformers and oil switches, wiring conduit, and metal lamp sockets.

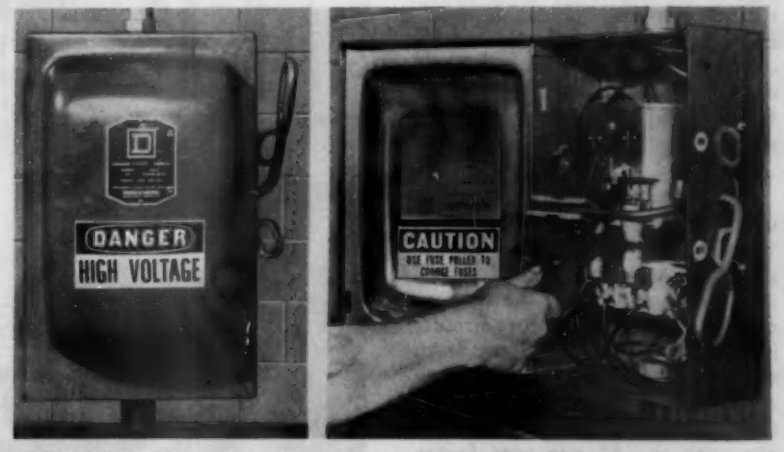
Frames of all portable motors which operate at more than 50 volts to ground should be grounded.

Motors should be of the type and size required for the load and for conditions under which they must operate. Overloading for long periods, use of non-approved motors in areas containing flammable vapors or dusts, and defective wiring should be avoided.

Motor windings should be protected from metal particles, dirt, dust, lint, or other material which may damage the windings or become ignited.

In areas containing flammable dust and gases, motors designed for hazardous locations should be installed. The *National Electrical Code* should be followed.

Grounded metal enclosures are



WHEN CHANGING FUSES, switch should be in off position and nonconductive fuse pullers used. Self-sticking tape signs remind workers of precautions. Handle can be locked in off position. (W. H. Brady Co.)

recommended for starting rheostats, switches, fuse panels, and other operating accessories.

In some devices, both switch and fuses are enclosed in a cabinet arranged so the switch can be operated without opening the cabinet. The switch is interlocked through a cam so that fuses are inaccessible until the switch is opened.

Another type of enclosed switch permits the door of the cabinet to be opened with a key, even though the switch is closed. With either type cabinet, it is possible to padlock the door open or closed, and the switch can be padlocked in the open position.

Maintenance precautions. When repair work is being done on motors, controlling devices, or the machinery they drive, the circuit should be de-energized by opening necessary switches and locking them in the open position.

If a switch cannot be locked open, it should be blocked and a tag attached showing that the switch is to be closed only by the man whose name appears on the tag. Warning signs should be displayed.

Wiring depends on type of building construction, size and distribution of electrical load, exposure to dampness or corrosive vapors, location of equipment, and other factors. For most plant conditions, rigid metal conduit, effectively grounded, is preferred.

Other methods which may be used under certain circumstances include armored cable, non-metallic sheathed cable, flexible metal conduit (BX), raceways, and open wiring on insulators. National and local wiring codes should be followed.

Aluminum wire. The current-carrying capacity of aluminum wire is 84 per cent of that of copper wire as specified in the 1953 and earlier editions of the *National Electrical Code*. For circuits it has been common practice to use an aluminum conductor two American wire-gauge sizes larger than a copper conductor to comply with the 84 per cent factor given in the code.

—*To page 211*

Tools—Hand and Power

HAND TOOLS, the craftsman's companions since the beginning of civilization, are still needed to put the finishing touches on many machine-made products and in construction and maintenance work.

Estimates are that hand tools are involved in from 5 to 15 per cent of disabling occupational injuries and a large but unknown number of minor wounds. Most of these are caused by accidental contact with cutting edges or by severe blows.

Portable power tools have speeded up many jobs and have added hazards of high speed. With electric tools there is also the risk of shock.

Types of Tools

Tools commonly used in industry are of 5 general types:

1. Metal cutting. Cold chisels, marking tools, hacksaws, bull chisels, files, tin snips, and cutters.

2. Wood cutting. Chisels, gouges, saws, axes, adzes, hatchets, knives, brad awls, planes, scrapers, bits, and drawknives.

3. Lifting. Levers, crowbars, jacks, hooks, and shovels.

4. Torsion. Wrenches, pipe tongs, screwdrivers, and pliers.

5. Striking. Hammers, sledges, mauls, picks, and punches.

Accident causes. One or more of four causes are primarily responsible for injuries. Following are examples:

1. A wrong or improvised tool—a file or screwdriver for prying; a wrench for hammering.

2. A defective tool—a mushroomed chisel head; a dull saw or knife; a split maul handle; a tool of poor quality.

3. Tools incorrectly used—striking two hard-surface tools together; failing to take practice swing with sledge to adjust for clearance; pulling on pliers in line with face.

4. Tools not put away—wood chisel loosely laid in tool box; hammer left on edge of machine; knife left on table.

Selection. Tools for both routine and special work should be kept in stock or readily available. High-grade tools are the best buy and the difference in initial cost

—*To page 208*

TOOL BOARDS encourage better housekeeping and more systematic care of tools. (Panhandle Eastern Pipe Line Co.)

Belts and Harnesses

—*From page 154*

Shock absorbers incorporated in harness and life lines reduce the severity of impact. This decreases both the possibility of injury to the wearer and failure of the equipment.

Life lines. For most life lines, ¾-in. manila rope or ½-in. nylon rope is recommended.

Nylon rope has more stretch than manila which enables it to absorb shock and sudden loads. It has high tensile strength wet or dry, is tough, flexible, durable, and easy to handle—resists moisture and mildew and can be stored wet.

REGULAR cleaning and application of a good leather dressing prolongs the life of a safety belt.

Steel cable without a shock absorber should not be used for life lines where a free fall is possible, because its rigidity increases the impact load. Metal cables should not be used around electricity.

Care of Belts

Leather. Brush dust off carefully to avoid scratching. Then wash with warm water and saddle soap or mild soap. Rinse in clean, warm water and dry at room temperature.

Treat with neatsfoot, castor, soybean, or a compound oil, not a mineral oil.

Never expose to excessive heat.

Watch carefully for cuts or scratches on the skin side of the hide. Condemn if there is a deep cut on the skin side.

Webbing. Fabric belts should not be worn if outer plies are cut or worn through.

Wash in soapy water, rinse and dry in moderate heat. They will stand any heat up to the boiling point of water.

Consult manufacturer about dressing.

Hardware. Check and replace if it shows signs of wear. If riveted, examine each rivet separately.

Inspection. Employees who wear belts should inspect them before use. An experienced inspector should check them every 1 to 3 months.

Life lines. Wash with mild soap and water and dry in circulating air. Do not expose to high temperatures. Keep rope in open coils; never bend sharply.

What to Look for In Auto Seat Belts

What should a motorist look for in purchasing a safety belt?

The variety (and varying quality) of belts on the market today makes it advisable to buy from a reputable dealer. As a further guide, the Automotive Crash Injury Research Group at Cornell University recommends that:

1. Loop strength of belt and buckle be at least 3,000 lbs.
2. The belt be at least 2 in. wide.
3. Only one person be supported by a belt.
4. The buckle be simple to operate and easy to release.
5. The belt be anchored to the car frame, not the seat.

AUTO SEAT BELTS are being installed in an increasing number of company cars. (National Supply Co.)

Too, seat belts must be comfortable and convenient to use, and be worn at all times. Safety-belt users report the belts provide a more comfortable, less tiring ride. For maximum protection, they should have not more than 4 in. of slack—not too tight or too loose.

Getting the Wear Out of Safety Shoes

Keeping shoes clean adds to their life as well as to their appearance. Muddy shoes should be cleaned with mild soapsuds and wiped dry if possible.

Shoes can be preserved and made more water repellent by treating with animal or vegetable oils or shoe compounds once a week or oftener. Shoes of smooth leather should be cleaned with saddle soap. Polishing with shoe polish helps to preserve leather.

When shoes become wet from perspiration or from outside moisture, they should be dried away from heat. When drying, shoes should be placed on ventilated shoe trees to keep their shapes. If shoe trees are not available, shoes can be stuffed with crumpled newspaper. Dried shoes should be treated with neatsfoot oil.

Leather can be made water repellent with silicone dressing.

Some Hot Jobs Can Be Made Comfortable

Operators of overhead traveling cranes often are subjected to extreme heat and humidity, as well as to gases, vapors, and dusts from operations below.

Cab coolers designed to improve conditions on such jobs are self-contained units that need only an electrical connection. They supply clean air, cooled and dehumidified, to the cab.

Locomotive cranes, which often operate in hot locations, can be provided with similar equipment. It can also be used to heat the cab in cold weather.

For pulpits and other control locations in steel mills where heat, dirt, or fumes create uncomfortable and hazardous conditions, similar equipment has been designed.

Tools

—*From page 206*

is offset by longer life, reduced upkeep, and lessened risk of accident.

Suitable arrangements should be made and responsibility placed for the purchase, handling and care of tools. The purchasing department should be kept informed of tool performance as a guide to future purchases.

Alloy steels combine strength and toughness with light weight which justifies the higher cost for some jobs. Alloys are used for hammers, wrenches, screwdrivers, woodworking tools, pliers, rivet sets, saws, knives, and punches.

Some alloys resist mushrooming and chipping but no tool should be subjected to unnecessarily rough use.

Non-ferrous hammers or mallets should be used for striking tempered or case-hardened tools. These hammers are usually made of copper, lead, bronze, brass, rawhide, or wood.

Handles. With hammers, sledges, axes, and picks, the greatest strain is where wood and metal join. An adequate supply of good handles should be kept in the toolroom. These should be straight-grained wood, free from slivers. Hickory, ash, and maple are preferred. Handles should be fitted by an experienced person.

Insulated tools. For working near electrical equipment, tools with insulated handles are frequently used. These provide desirable protection but are not a substitute for rubber gloves and other protective devices.

Marking tools. Steel stamps and holders for stamping indentification marks on machine parts and other metal surfaces are available in alloys which resist mushrooming and do not chip readily.

Car movers. For moving cars on rails, car movers which do not slip readily are available. When two men are needed to move a car, two car movers should be used. Ordinary crowbars should not be used.

The Tool Room

Centralized tool control facilitates uniform inspection and maintenance of tools. Protective equipment, such as goggles, should be recommended and issued with the tools.

Centralized control also makes it possible to keep records on tool failure and locate unsafe conditions and unsafe acts. Tools are exposed to less damage than with scattered storage.

A procedure can be set up so the attendant can send tools in need of repair to a department equipped for reconditioning.

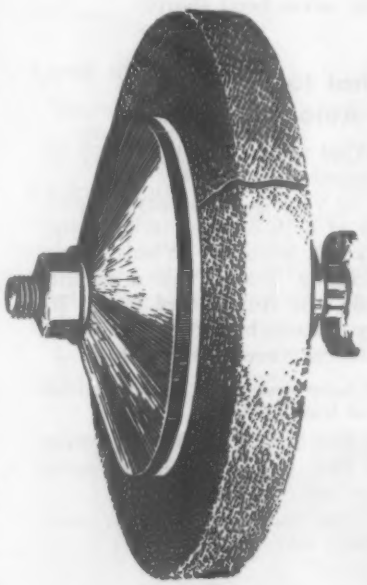
A set of numbered checks can be issued to each employee at the time of employment. These are exchanged for tools at the supply room. By this system the attendant knows where each tool is and can call it in for inspection at regular intervals.

When there are operations at several locations it is not always practicable to maintain a tool sup-

THE STORY *of the* BROKEN GRINDING WHEEL

A whirling grinding wheel can tell its own story of havoc when it explodes . . . But in this case Perks Safety Washers do the telling!

A test conducted in the Sta-Safe laboratory used the new neoprene faced Perks Safety Washers and an 8" grinding wheel cracked in two places. At 5,000 RPM —an outer surface speed of 12,500 feet per minute— Perks Safety Washers held the wheel intact!



Standard Safety does *not* recommend to you the use of broken grinding wheels—even with Perks—but Standard Safety does recommend Perks Safety Washers as a precaution against possible tragedy in your company. Perks Safety Washers are easily installed on any size grinding wheels. Keep your equipment and personnel safe-guarded. Write now for Bulletin No. 54 containing complete information about Perks Safety Washers.

STANDARD SAFETY EQUIPMENT CO.

232 W. Ontario St., Chicago 10, Illinois

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ply room. In such cases the foreman should inspect tools frequently and take out of service those found defective. A check list is helpful.

Some workmen provide their own tools. These should receive the same inspection as those owned by the company.

Carrying Tools

Tools should never be carried where they interfere with using both hands while climbing. A strong bag, bucket, or other container should be used for hoisting or lowering tools.

Chisels, screwdrivers, and pointed tools should never be carried edge or point up in the pocket. They should be carried in a tool box or cart, in a carrying belt like those used by electricians and structural steel workers, in a pocket tool pouch or in the hand with points and cutting edges away from the body.

Display boards used for maintenance and repair tools encourage return of equipment.

Racks or bins which can be moved to the work area are also useful.

Each workman's tools should be kept in a box or rack convenient to his work area. The box should have designated places for wire brushes, chisels, saws, and knives to avoid sharp edges being exposed.

Inspection. Permissible wear limits for tools should be set up as a guide for inspection when they are returned to the crib. Lacking such standards, the attendant or inspector should be qualified to pass on the condition of the tool.

Periodic inspections of tool operations are needed to insure efficient control. Inspections should include housekeeping in the tool crib, tool service, number of tools in the inventory, handling procedure, and condition of tools.

Maintenance and repair require adequate facilities, such as work benches, vises, forge or furnace for hardening and tempering, tempering baths, repair tools, grinders, goggles and adequate lighting. Repairs should be done by trained men.

Non-Sparking Tools

Tools of non-ferrous materials are often used where flammable gases, highly volatile liquids, and other explosive substances are used or stored. These tools are made of such metals as aluminum, bronze, brass and beryllium-copper.

Tools made of these alloys include hammers, chisels, punches, prybars, screwdrivers, scrapers, spatulas, picks, and shovels. Special tools of any type can be made to order.

Substances easily ignited include gunpowder, lint, TNT, carbon disulfide, and ethyl ether.

Being softer than steel, nonferrous tools are less likely to break off fragments from the metal being worked on by the tool.

With continued use, these tools may become impregnated with particles of foreign substances which may cause sparks if not

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For PRESS STAMPING PRODUCTS WITH CURVED OR STRAIGHT LINE MARKING
PRESS STYLE STEEL TYPE HOLDER
MODEL PH-50
One piece shank and body. Made with any style shank.
Body and press shank are one piece with flanges to hold type chase in position. Type chase with almost any size or number of characters can be removed and inserted without operator placing hands in press.
Type chase, easily removed —changed and inserted.
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This fan guard prevents hand, arm and head injuries. Made of strongly woven cotton mesh fabric, with one-quarter inch openings. It is washable, mildew proof, non static, and won't interfere with the normal flow of air. Cover protects back and sides of fan as well as the front.
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NOW—A light, easy handling Wrench that is NON-SPARKING for use in Hazardous Atmospheres

Frontier 40-E Aluminum Alloy Pipe Wrench with Beryllium Alloy Jaws

DESIGNED and TESTED to HEAVY DUTY WRENCH STANDARDS

Here is a wrench mechanics like. It's easy to use, non-tiring on overhead work, light and strong, perfectly balanced... and best of all it's SAFE because it's non-sparking. That's important when working in hazardous atmospheres where one spark might cause an explosion.

Replace heavy and unsafe tools now, before it is too late. It costs only a little more to enjoy the safety of Frontier non-sparking wrenches. Order direct—immediate service.

Factory to User Prices

Size	Wgt. Lbs.	Handles Pipe	Price Ea.*
14"	1.8	2	13.60
18"	3.1	2½	17.80
24"	5.1	3	24.40
36"	9.5	4½	37.20

*f.o.b. factory, Niagara Falls, N.Y.

FRONTIER BRONZE CORPORATION
4897 Packard Road, Niagara Falls, New York

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Reduce Insurance Costs • Cut Time Loss • Save Lives!

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STANDARD WHEEL GUARDS
... on your portable tools

STOP costly accidents with MORRISON Standard Wheel Guards! Safety codes and laws REQUIRE guard protection. Specify MORRISON for maximum safety... lighter weight... lower cost... greater strength. Full protection for operator with minimum interference with work.

Remember, MORRISON also makes revolving cup guards. There is a MORRISON Guard for every application . . . all are made to comply with American Standard Safety Code.

SEE YOUR GRINDING WHEEL SUPPLIER OR WRITE:

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removed. Frequent inspection is needed.

Non-ferrous alloys are more expensive than steel and special tools are used only where there is an explosion hazard.

Portable Electric Tools

General classifications of hand-operated, power-driven tools are:

1. Abrasive tools, such as disk and portable belt sanders, polishers and bench and flexible shaft grinders.
2. Drills.
3. Saws and other cut-off tools, routers, etc.
4. Assembly tools, such as screwdrivers, nut runners, and tappers.
5. Hammers.
6. Sheet-metal shears.
7. Fans.

Portable electric tools are generally designated as:

Light duty, for intermittent use on light work.

Special duty, or **standard duty,** for slightly heavy work or fairly continuous operation.

Heavy duty, for continuous operation and production service or for heavy work.

Safety switches, which operate the motor only while the switch is held in the closed position, should be used.

Grounding the shell by means of a third wire or central grounding is the most practical method of safeguarding against shock. Non-conductive material, such as plastic, for shell and handle minimizes the shock hazard but plastic is more easily broken than metal. * * *

References—Portable Hand and Power Tools

National Safety Council: Accident Prevention Manual for Industrial Operations, 1955.
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—Extension Cords; Data Sheet D-Gen. 21.
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—Explosive Splitting Wedges or Guns; Data Sheet D-321.
National Safety News: When You Use Portable Electric Tools; Apr. 1948.
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—Check It to Check Your Accidents; George MacDonald, Feb. 1953.
—Why Electric Tools Are Safe; E. L. Connell, Apr. 1954.

Electricity

—From page 206

Cords, Sockets, Lamps

Extension cords should be of a type listed by Underwriters' Laboratories and labeled to show compliance with the *National Electrical Code*. They should be inspected regularly. Kinking or excessive bending of cords should be avoided.

Ordinary lamp cord should not be used where it will be exposed to mechanical wear or to moisture—never for extension lamps in boilers, tanks, or on damp or metal floors.

Cord for portable tools and equipment is made in several grades. Rubber-sheathed cord should be used with tools and lamps in boilers, tanks, and other grounded enclosures.

For heating devices, such as electric irons and water heaters, cord requires an insulating covering containing flameproofing material such as asbestos fiber. It resists high temperature and moderate dampness.

Sockets should be of porcelain, non-conducting plastic, or rubber covered. Underground metal-shell sockets are not recommended.

Extension lamps are sometimes used where a shock of 110 volts might be fatal. Safe cords and lamp holders must be provided and maintained in good condition. Handles should be of non-conducting material and there should be no metallic connection between lamp guard and socket shell.

Because metal frames of portable electrical equipment should be grounded, cord with a green covered ground conductor should be used with a polarized plug and receptacle. If plant circuits do not have polarized receptacles, a third wire taped at intervals to the cord may be used. One end of the third wire is connected to the frame of the tool; the other end, which should be several feet longer than the cord, is clamped to a water pipe or other effective ground with a spring clip.

Miniature voltage. Portable transformers which step the lamp

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The handiest, fastest, safest way to make drilling set-ups! Just drop in and drill — all shapes — all sizes. We guarantee it will save its cost in labor alone in six months—to say nothing of the savings from uninterrupted production. We'll put one in your shop for 30 days. Not one penny cost to you if you aren't enthusiastic. Literature on request.

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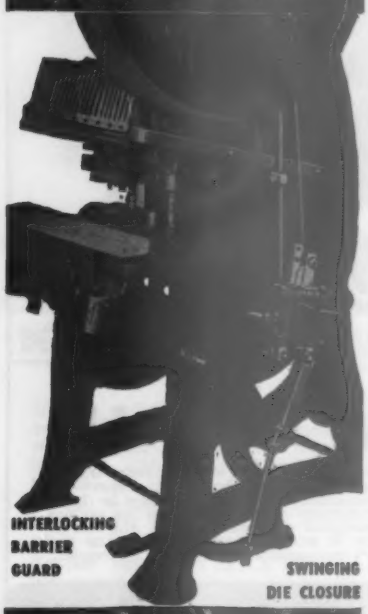
JUNKIN
SAFETY GUARDS



Your SUREST Protection Against Press Accidents

JUNKIN safety guards prevent press accidents, afford maximum protection, increase press production, lower insurance costs and generally improve plant morale. Make an investment in safety now and investigate Junkin Safety Guards for primary and secondary punch press operations. Write for free catalog "The Key to Protection".

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voltage down to 6 volts are frequently used where shock hazard is serious.

Employee training. The safety program should include thorough training of employees who install or operate electrical equipment. In addition to instruction in the hazards of electricity they should be trained in first aid.

Of particular importance is knowledge of the arm-lift, back-pressure method of resuscitation. Distribution employees should also know the pole-top method.

Over-Current Devices

Fuses or **circuit breakers** should be installed in every circuit for protection of both personnel and equipment. These devices open the circuit automatically in the event of excessive current flow caused by accidental ground, short circuit, or overload.

Types of fuses include:

Link fuse, a strip of fusible metal between two terminals of a fuse block. If exposed, it may scatter hot metal when it blows.

Explosion fuse, used in central stations, powerhouses or on overhead lines. When it blows, the gases generated aid in quenching the arc.

Plug fuse, used on circuits which do not exceed 30 amperes at not more than 150 volts to ground. The type which cannot be bridged inside the holder is recommended.

Cartridge fuse, which has a fusible metal strip enclosed in fiber tubes. Available are those which indicate when the fuse is blown and the refillable type in which fusible elements may be replaced.

Insulated fuse pullers, should be kept on hand for pulling and replacing fuses. In installations complying with the code, fuses are protected by a switch which de-energizes the fuses when opened. If the fuse is not protected by a switch, the supply end of the fuse should be pulled out first, and in replacing, the supply end should be inserted last.

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Power Press Guards

Protect Operators • Increase Production

Wiesman cam-action press guards enable operators to work at top speed without fear of accident. Guarding is effective and completely automatic . . . does not hamper operator's vision or movement. For all sizes and styles of presses. Used by hundreds of firms. Inexpensive . . . easy to install.

Over 33,000 sold

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small •
COMPACT L-O-N-G LIFE
(500 Hours and Up)
with the **C & E** (Ericson)

Extension handles up to 12 ft. can be had

INSPECTION LIGHT

A real serviceman's light. C & E (Ericson) No. 124 Series inspection light goes through ¾" dia. holes; through small openings in machines and other places hard to get at. Automotive type, 6- to 8-volt bulb is small, strong, low priced, longest in life; plugs into 110-volt circuit. Bayonet base insures constant contact. Light throws spot beam; provides side illumination.

C&E

Get details on complete line of small-diameter, low-voltage inspection lights.

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Electrical safety products

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SOLDER WITH SAFETY AND SPEED

USE WILDER

ADJUSTABLE SOLDERING IRON HOLDERS

Three sizes for large and small irons. Can be placed on top of bench, fastened under bench or clamped to bench top or shelf. Available with wiping pad attachment, also slide for fastening small holder to large.

Write for further information.

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DEPT G

MECHANIC ST. & ERIE R.R. PORT JERVIS, N.Y.

Circuit-breakers, used in high voltages or large current capacity circuits and are becoming more common in many kinds of circuits. They may be instantaneous in operation, equipped with timing devices, manually or power operated.

Switches

Types of switches include snap switches, knife switches, enclosed externally operable air-break switches, and oil switches. Those designed for controlling individual motor and machine tools and for lighting and power circuits are of the enclosed type.

Switches, fuses and automatic circuit breakers should be plainly marked, labeled or arranged to afford ready identification of circuits or equipment supplied through them.

Open-knife switches are undesirable because of exposure of

References—Electricity

National Safety Council: Accident Prevention Manual for Industrial Operations, 1955.
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—Grounding Portable Electric Equipment; Data Sheet D-299.
—Locking Out Electric Switches; Data Sheet D-237.
—Testing Insulated Wires and Cables; Data Sheet D-EE3.
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American Standards Assn.: National Electrical Code; C1-1951 (NBFU Pamphlet No. 70).
—National Electrical Safety Code; C2-1947 (NBS Handbook H30).

Underwriters' Laboratories: Electrical Appliance and Utilization Equipment List.
Hazardous Location Equipment List.

ELIMINATE ALL SAW HAZARDS!

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NEW! VISUAL SAFETY TOOL

A versatile combination visual circular saw guard and saw fixture, uniting the ultimate in precision-designed tools for efficient guiding with the maximum in 100% safe guarding, has recently been introduced and marketed by the Brett-Guard Company. Simple to set up . . . economical for both large and small jobs . . . so safe that it's being used in vocational schools for the blind . . . made of transparent PLEXIGLAS that lets you see what you saw . . . fully adjustable for all those impossible-to-guard cuts . . . fitting all circular table-type saws for 6" to 22" blades . . . here is truly the last word in both safety and efficiency!

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16 MM DEMONSTRATION SOUND FILM! Available free loan.

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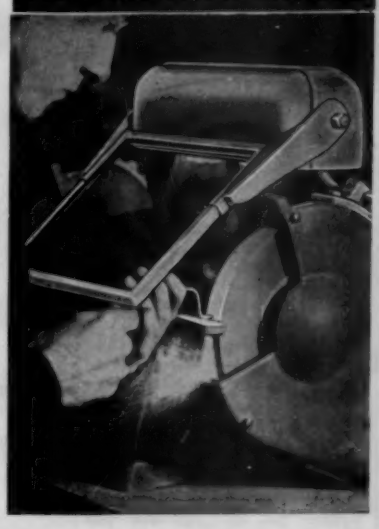
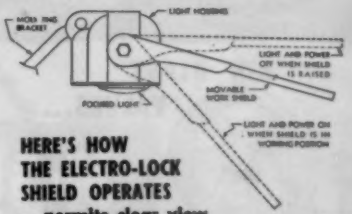
JUNKIN ELECTRO-LOCK SHIELD



The Shield Which Commands Operator Safety

The position of the Junkin Electro-Lock Shield is controlled by mercury switches. Interlocking power and light circuits will not permit the machine to operate unless the shatter-proof shield is in a completely protective position. Affords perfect visibility, and protects the operator from flying particles. Write for free bulletin No. 103.


LIGHT HOUSING
LIGHT AND POWER OFF WHEN SHIELD IS RAISED
MOVABLE WORK SHIELD
FOCUSED LIGHT
LIGHT AND POWER ON WHEN SHIELD IS IN WORKING POSITION

HERE'S HOW THE ELECTRO-LOCK SHIELD OPERATES —permits clear view of work, still providing maximum protection

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COMMON SENSE SAFETY FOR PUNCH PRESSES

Direct quotes from a survey of users show their reasons for switching to Safeguard pullouts.

* Protection from repeats.

"Most important feature is that which makes it impossible for the operator to be "caught" by any pneumatic, electrical or mechanical failure of the press or its controls"

** Production

"A definite increase in production due to the fact that the press operators may now release the press from the foot pedal leaving both hands free to pick up work for the next cycle"

"Prior to Safeguards, production standards—(were) 841 to 1508 pcs. per hr. —after Safeguard, 934-1915 pcs. per hour."

"I am enclosing a sample piece from one of the presses on which we are using Safeguard. The rate on this particular job is 2,500 pcs. per hour."

*** Operator Acceptance

"It was only a matter of days after the first trial-before the operators were expressing interest in getting more of them.

Write for full information

Safeguard Manufacturing Co.
Woodbury, Conn.

live parts and because of the arc formed when the switch is open. Knife switches should be enclosed in grounded metal cabinets having a control level extending through a slot in the cover.

Oil switches have contacts which operate while submerged in oil. They are especially desirable in circuits of 750 volts or more and may be used also in lower voltage circuits.

Snap switches, such as push-button or toggle types, have live parts enclosed. Flush switches should be installed in metal boxes, and surface switches used in open wiring and moulding work should be mounted on porcelain or plastic sub-bases. These switches should indicate whether the circuit is open or closed.

Snap switches are preferable to key or pull-chain sockets. Key sockets, if used, should be porcelain, plastic, or other nonconductive material. Pull-chains should contain nonconductive links.

Protection against accidental shock from live electric parts, such as switchboards, fuse panels and control equipment, is obtained by insulating the floor area within reach of live parts.

For low-voltage exposure, dry wood floors without metal parts, or insulating mats, may be used. Mats should be nonconductive and moisture resistant. * * *

AIR OPERATED
LITTELL units
• SAVE MONEY
• SAVE FINGERS
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WITH dependable air operated safety units by Littell

Pres-Vac
SAFETY FEEDERS...
safely feed blanks to press from the safe distance of 14 inches —BY AIR!
Save those fingers.
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eject parts safely with each stroke of the press—BY AIR!
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SHEET LIFTERS..
handle sheets of steel glass, plywood, boxes, cabinets, etc. Safely—
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"I'm all finished, Gus. We can go home now."

IN SECTION 9:

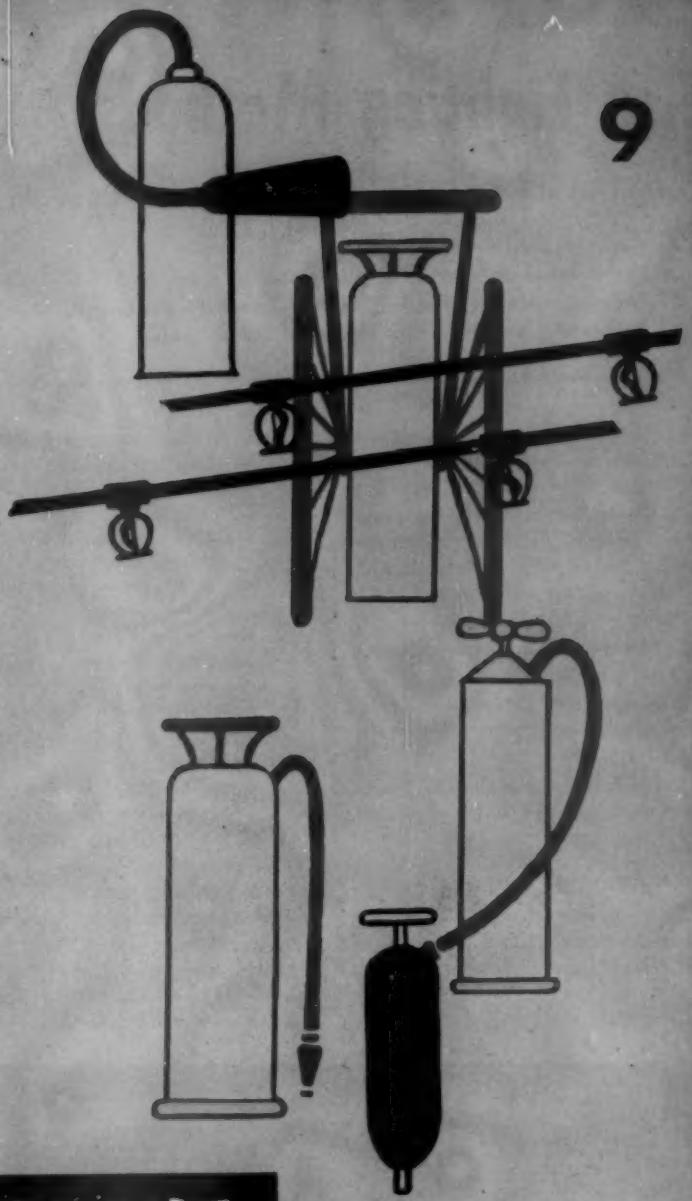
Fire-Fighting Methods 216
Portable Extinguishers 217
Automatic Protection 224
Training Fire Fighters 228
Weed Control 236
Static Electricity 237
Spontaneous Ignition 240

EVERY DAY nearly a hundred industrial plants suffer serious damage from fire. Of those destroyed, 40 per cent never reopen for business.

Fires often seem to strike suddenly and mysteriously. But investigation usually reveals weak spots in the company's defenses. Usually there is a combination of defects in building or equipment, plus human failure.

The fire-safe plant has these: fire resistive construction, limitation of fire areas, segregation of hazardous storage and processes, and protection of openings in walls and between floors. To these should be added automatic systems of detection and extinguishment.

But plant protection cannot become entirely mechanical and automatic. Portable apparatus and trained men are also important in the program.



9

PLANT PROTECTION

Fire Fighting Methods

Control of fire and protection of property through:

1. **Fire prevention engineering.**
2. **Early detection and extinguishment.**
3. **Limiting damage due to fire and fire extinguishment.**
4. **Preventing personal injuries from fire or panic.**

CAUSES OF FIRE. The majority of fires in industry can be traced to four general causes:

1. Open flames, high temperatures. Stoves, furnaces, salamanders, welding and cutting, lamps, heated pipes and surfaces, matches, smoking.

2. Friction. Hot bearings, belts, cutting, grinding.

3. Electricity. Defective wiring, arcs, sparks, heat resistance, static electricity.

4. Chemical reactions. Spontaneous ignition, reagents, acids, oxidizing agents.

Extinguishing Methods

Many types of apparatus have been developed for various risks but all extinguishing methods are based on one or more of three principles:

1. Eliminate oxygen from air.
   (a) Replace air with inert gas.
   (b) Exclude air with a noncombustible cover.
   (c) Use a chemical which will dilute oxygen in air below point required to support combustion.
2. Remove fuel supply.
   (a) Shut off flow in liquid or gas supply lines.
   (b) Remove burning fuel.
3. Reduce temperature below ignition point.
   Cool burning material with water or chemicals.

Fire prevention engineering. The services of a qualified fire prevention engineer often will be helpful in planning prevention and protection.

First step is a survey of the plant—layout, manufacturing processes, materials handled, storage methods, and fire-protection facilities.

With this information, plans can be made for improving structure and layout, installing additional equipment where needed, and training employees in prevention and extinguishment.

Water Supply. Water is the most widely used and effective extinguishing medium for most fires. Important exceptions are those with electrical equipment, flammable liquids, and materials where use of water would be hazardous and water damage excessive.

In determining supply requirements, structural conditions and processes, and the number of streams that might be required to cope with a blaze must be considered.

Pumps should supply enough streams at adequate pressure. Allowance should be made for pumps out of service for repairs and for continuity of pumping in event of power failure.

Hydrants should be located throughout the plant area so as to give adequate coverage of all buildings, and preferably not more than 50 ft. from any building.

Maintenance must be systematic. When hydrants are installed provide drainage to minimize the danger of freezing in cold weather. Hydrants should be kept clear of snow and a thawing device provided.

Standpipe and hose provide effective protection inside buildings when used by men trained in handling heavy streams. They are a valuable auxiliary to the city fire department. Piping should be of sufficient size for buildings of more than four stories.

Couplings. All outside hydrant nipples and hose couplings should have American Standard 2½-in. fire hose thread.

The 2½-in. single jacketed rubber-lined hose is ordinarily used outside. It is flexible and lightweight. Double-jacket hose is used principally for rougher service in municipal fire departments.

Rubber-covered hose is some-

MOBILE APPARATUS. Supplementing the conventional fire truck in the background is "Smokey the Cub," a tractor converted into a highly maneuverable piece of equipment. Rear platform carries two extinguishers and can accommodate two firemen. Another platform at side carries hose and additional extinguishers. Heavy duty front bumper was installed for heavy double swing type gravity doors. (International Harvester Co.)

Portable Extinguishers

First line of defense against fire

times needed where there is exposure to fumes or corrosive liquids. Neoprene has been found superior to natural rubber for most uses. Dacron is also being used.

The 1½-in. hose is useful for small fires and for wetting down fires after the blaze is under control. It can be handled by one or two men.

Playpipes and nozzles. Standard underwriters' playpipes throw an effective stream but are difficult to handle, particularly on ladders. The short, rigid playpipes with strap and ladder hook, with shut-off nozzles to reduce water damage, are more suitable for plant use.

Adjustable spray and straight stream nozzles (for both 2½- and 1½-in. hose) give water-curtain protection for firemen and a blanketing effect. They also provide solid streams for penetration.

Water spray (fog) nozzles are effective for oil fires. Water fog, owing to its low conductivity, can be used safely on electrical fires. Its effective range is only a few feet but this can be offset to some extent by using applicator pipes of varying lengths.

Foam-generating equipment is used where large quantities of flammable liquids are stored. For some exposures permanent generating equipment should be installed.

Foam systems may be either automatic or manually operated. There are two types of foam, chemical and mechanical.

Chemical foam is formed by a chemical reaction in which masses of bubbles of carbon dioxide gas and a foaming agent produce an expanded froth.

Mechanical foam consists of bubbles of air produced when air and water are agitated mechanically with a foam solution. * * *

PORTABLE extinguishers can be brought into action in the vital minutes before the company or city fire department can reach a blaze—sometimes before sprinklers can operate. Their prompt use by trained employees has prevented heavy losses from both fire and water.

The limitations of portable apparatus should be recognized. They are not a substitute for heavy-duty or automatic equipment.

Types of portable extinguishers in general use are:

1. Anti-freeze.
2. Carbon dioxide.
3. Dry chemical.
4. Foam.
5. Pump tank.
6. Soda and acid.
7. Vaporizing liquid.
8. Water-filled (gas cartridge or air pressure).
9. Water pails.

Some extinguishers are available in both hand and wheel types. The latter is moved easily and has extra extinguishing capacity.

For Class A Fires Only

These extinguishers should be used only on Class A fires in ordinary combustible materials—never on flammable liquid, grease, or electrical fires.

Anti-freeze solution extinguishers are of two basic types. One uses a cartridge which releases expellant gas when punctured. The other uses a shut-off valve which retains the gas in the same single chamber with the extinguishing solution.

Extinguishing agents are either calcium chloride or alkali-metal salt solutions (loaded stream). The latter are more effective than soda-acid extinguishers of equal size.

Only recharges furnished by the manufacturer and specified on the extinguisher nameplate should be used.

Solutions will give protection at temperatures as low as —40 F.

Water-filled extinguishers are similar to the anti-freeze type but

FIRE EXTINGUISHER FACTS (over)

TYPE	CONTENTS	KINDS OF FIRE	HOW TO START	DISCHARGE
CARBON DIOXIDE	Liquid carbon dioxide under pressure	CLASS B (oil, gasoline, paint, grease)	Pull pin and open valve	6-8 ft. About 42 sec. (15-lb. size)
VAPORIZING LIQUID	Carbon tetrachloride and other chemicals	CLASS C (live electrical equipment) * * *	Turn handle, then pump by hand	20-30 ft. 40-45 sec. (1-qt. size)
DRY CHEMICAL	Bicarbonate of soda with other dry chemicals and cartridge of carbon dioxide gas	These extinguishers also have some effect on CLASS A fires (wood, paper, textiles)	Pull pin and open valve (or press lever), then squeeze nozzle valve	About 14 ft. 22-25 sec. (30-lb. size)

SAFETY INSTRUCTION CARD No. 469
National Safety Council

TYPE	CONTENTS	KINDS OF FIRE	HOW TO START	DISCHARGE
SODA ACID	Bicarbonate of soda solution and sulfuric acid	CLASS A (wood, paper, textiles, etc.)	Turn over	For 2½ gal. size 30-40 ft. 50-55 sec.
PUMP	Plain water		Pump by hand	
GAS CARTRIDGE	Water and cartridge of carbon dioxide gas	CLASS A ("Loaded stream" is also good on small CLASS B)	Turn over and bump	
FOAM	Solution of aluminum sulfate and bicarbonate of soda	CLASS A and CLASS B (oil, gasoline, grease, paint)	Turn over	

DO NOT USE *These Water Base Extinguishers* **ON ELECTRICAL FIRES** (see other side)

use plain water as the extinguishing agent. Either gas cartridge or stored air pressure may be used as the expellant.

Pump tanks are covered containers, usually cylindrical, with a double-action pump, discharging through a short length of hose and a nozzle. The tank is filled through a removable cap at the top.

For low temperatures, anti-freeze solutions are used.

Water pails. The most useful type is the 12-qt. size with flat bottom, made of 24-gauge galvanized iron. A loose-fitting cover keeps out dirt and retards evaporation. Pails should be painted bright red with FIRE in large letters.

If calcium chloride anti-freeze solution is used, pails should be coated inside, first with red lead then with asphalt-base paint. Calcium chloride of "fire protection grade" should be used.

Soda-acid extinguishers have an outer container holding a charge of sodium bicarbonate dissolved in water and an inner container of acid. They are operated by inverting, which allows acid and bicarbonate solution to mix. Carbon dioxide gas is generated with sufficient pressure to propel the contents.

Common size is 2½ gals. It provides a stream 30-40 ft. which lasts about 1 minute.

For Class A and Class B Fires

These extinguishers are suitable for Class A fires in ordinary combustibles and Class B fires in flammable liquids where a blanketing effect is needed. Never use on electrical fires.

Foam. The chemical foam extinguisher is shaped like a soda-acid extinguisher and operated the same way. In place of plain water it contains a foam-making ingredient.

When the extinguisher is inverted, the chemicals mix and force out a foaming stream. The hand model contains 2½ gals. of liquid and generates 8 times that amount of foam.

In purchasing charges, brand and name of manufacturer should be specified.

CLASSIFICATION OF FIRE EXTINGUISHERS

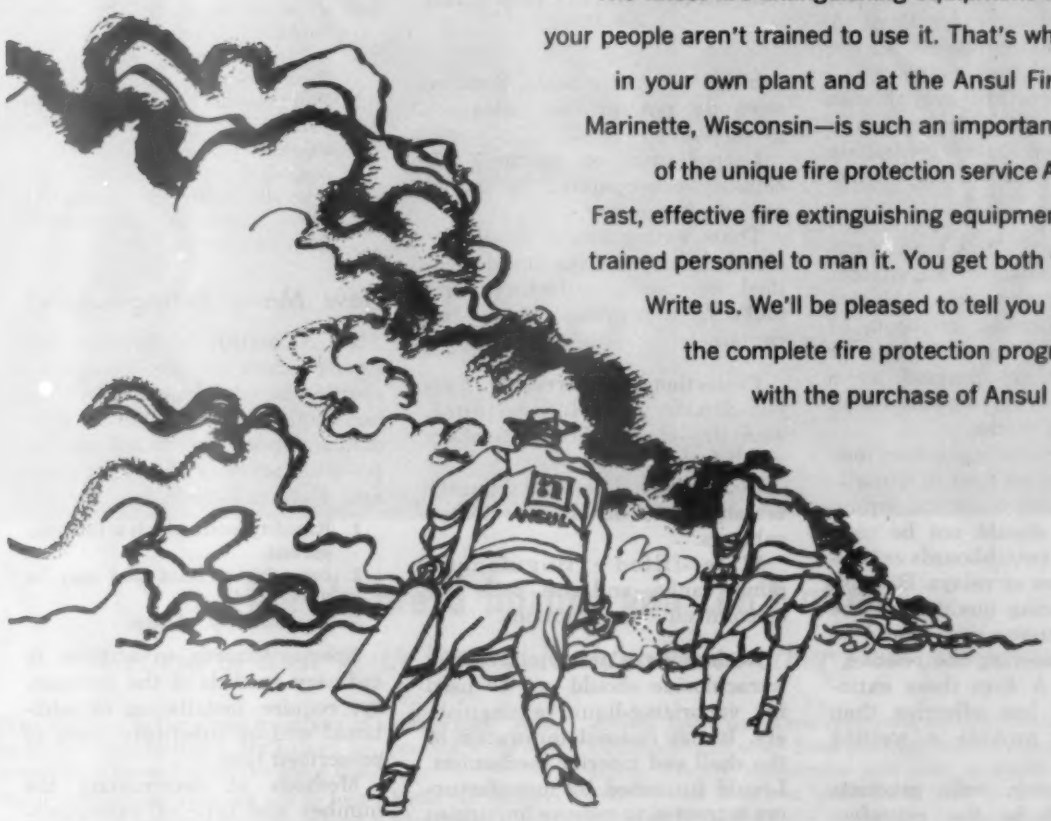
	Classifications Under Old Method	Approximate Classifications Under Present Method
Chemical Solution—Soda Acid		
1¼, 1½ gal.	A-2	1-A
2½ gal.	A-1	2-A
17 gal.	A	10-A
33 gal.	A	20-A
Water		
1½, 1¾ gal. (pump or pressure)	A-2	1-A
2½-gal. (pump or pressure)	A-1	2-A
4 gal. (pump or pressure)	A-1	3-A
5 gal. (pump or pressure)	A-1	4-A
17-gal. (pressure)	A	10-A
33-gal. (pressure)	A	20-A
6 10-qt. pails and 25 gal. cask (minimum)	A-1	2-A
Loaded Stream		
1-gal.	A-2, B-1	1-A
1¾ gal.	A-1, B-2	2-A, ½-B
2½ gal.	A-1, B-2	2-A, ½-B
33-gal.	A	20-A
Foam		
1¼-gal.	A-2, B-2	1-A, 2-B
1½-gal.	A-2, B-2	1-A, 2-B
2½-gal.	A-1, B-1	2-A, 4-B
5 gal.	A-1, B-1	4-A, 6-B
10-gal.	A, B	6-A, 8-B
17-gal.	A, B	10-A, 10-B
33-gal.	A, B	20-A, 20-B
Vaporizing Liquid (carbon tetrachloride base)		
1, 1¼, 1½-qt. (pump	B-2, C-2	½-B, C
1, 1½, 2, 2½-qt. (pressure)	B-2, C-2	½-B, C
1-gal. (pressure)	B-2, C-1	1-B, C
3½-gal. (pressure)	B-2, C-1	1-B, C
Vaporizing Liquid (chlorobromomethane)		
1 and 1½-qt. (pressure)	B-2, C-1	1-B, C
1 gal. (pressure)	B-2, C-1	2-B, C
Carbon Dioxide		
6 or less lbs. carbon dioxide	B-2, C-2	1-B, C
7½ lbs.	B-2, C-1	2-B, C
10 lbs.	B-2, C-1	4-B, C
12 lbs.	B-2, C-1	4-B, C
15 and 18 lbs.	B-1, C-1	4-B, C
20 lbs.	B-1, C-1	4-B, C
25 and 26 lbs.	B-1, C-1	6-B, C
50 lbs.	B-1, C-1	10-B, C
75 lbs.	B-1, C-1	12-B, C
100 lbs.	B, C	12-B, C
Note: Carbon dioxide extinguishers with metallic horns will not carry any C classification.		
Dry Chemical		
6¼ or less lbs. dry chemical	B-2, C-2	4-B, C
7½ lbs.	B-2, C-1	6-B, C
10 lbs.	B-1, C-1	8-B, C
12 lbs.	B-1, C-1	8-B, C
15 lbs.	B-1, C-1	8-B, C
20 lbs.	B-1, C-1	16-B, C
30 lbs.	B-1, C-1	20-B, C
75 lbs.	B, C	40-B, C
150 lbs.	B, C	40-B, C
300 and 350 lbs.	B, C	40-B, C
Wetting Agent		
10 gals.	A, B	6-A
20 gals.	A, B	12-A
50 gals.	A, B	30-A

ABOVE is the method of classifying extinguishers in NFPA No. 10, with classifications used in earlier editions. Table indicates approximate conversion from old to new method of classification. Since accurate classification of extinguishers already in service and labeled under the old method can be determined only by actual fire tests, only approximate conversion classification can be given.

IN FIRE EMERGENCIES

TRAINED PEOPLE MAKE THE DIFFERENCE

The finest fire extinguishing equipment won't help if your people aren't trained to use it. That's why training—in your own plant and at the Ansul Fire School in Marinette, Wisconsin—is such an important ingredient of the unique fire protection service Ansul offers. Fast, effective fire extinguishing equipment—plus the trained personnel to man it. You get both from Ansul. Write us. We'll be pleased to tell you more about the complete fire protection program you get with the purchase of Ansul equipment.



ANSUL CHEMICAL COMPANY / MARINETTE, WISCONSIN

FIRE EXTINGUISHING EQUIPMENT / INDUSTRIAL CHEMICALS / REFRIGERATION PRODUCTS / NATIONAL DISTRIBUTORS OF "FREON" REFRIGERANTS

Circle Item No. 172—Reader Service Card

For Class B and C

Only these extinguishers may be used safely on Class C fires (electrical equipment) as well as on Class B fires (flammable liquid). They do not contain water and need no winter protection.

Carbon dioxide. Portable carbon dioxide extinguishers consist of a storage cylinder, a hand-operated valve, and a discharge horn connected to the valve by flexible hose or a short piece of metal tubing.

These extinguishers are discharged by operating the valve by means of a handwheel, squeeze grip, or trigger.

The gas is noncorrosive and leaves no residue. It has no lasting blanketing effect and is not considered effective for Class A fires. These extinguishers have a comparatively short range.

Extinguishers are available in several sizes in both hand and wheel-mounted models containing from 2½ to 750 lbs. of carbon dioxide.

Dry chemical. This type of extinguisher consists of a container of dry chemical which is ejected by carbon dioxide, nitrogen, or dry air stored in cartridges or cylinders. It is operated by a quick-opening valve with on-off control of the discharge.

Dry chemical extinguishers may be used safely on fires in flammable liquids and electrical equipment. They should not be used on telephone switchboards or delicate contactors or relays. Because of the insulating qualities of the chemical, extreme care would be needed in removing the residue.

For Class A fires these extinguishers are less effective than those which provide a wetting action.

In recharging, only products recommended by the manufacturer should be used.

Vaporizing liquid. The extinguishing agent is specially treated carbon tetrachloride or chlorobromomethane. The charge is expelled by a hand pump or by air, nitrogen, or carbon dioxide pressure.

Most familiar model is the 1-qt. size frequently carried on motor vehicles and motor boats. Smaller sizes do not provide adequate protection.

Larger units of ½- to 3-gal. capacity are operated by stored gas or air pressure.

These extinguishers should be charged only with the liquid specified by the manufacturer and taken from previously unopened containers.

Protection from Freezing. Carbon-dioxide, vaporizing-liquid, and dry-chemical extinguishers won't freeze.

Foam and soda-acid extinguishers should be installed in heated cabinets.

Water-filled extinguishers, pump tanks, and fire pails use calcium chloride solutions.

Recharging. Commercial carbon tetrachloride should not be used for vaporizing-liquid extinguishers. It may cause deterioration of the shell and interior mechanism. Liquid furnished by manufacturers is treated to remove impurities and to depress the freezing point.

Before recharging foam and soda-acid extinguishers, the shells and all parts should be thoroughly rinsed with warm water. * * *

FIRE PREVENTION CHECKLIST

Fire Extinguishing Apparatus

In proper place ☐ Clearly marked ☐
Unobstructed ☐ In working order ☐

Housekeeping

Premises free of combustible materials ☐ Safe storage of flammables ☐
Metal containers for oily rags ☐ No leaks and drippings of flammables ☐
No accumulations of rubbish ☐ Passageways clear of obstacles ☐

Electrical Equipment

No bare wiring or badly worn insulation ☐ Motors and tools free of dirt and grease ☐
Ground connections clean and tight ☐ No lights near combustible materials ☐
Fuse and control boxes clean and closed ☐ No poor splices ☐
No makeshift wiring ☐

Heat and Flame

No Smoking areas clearly indicated ☐ Gas jets off ☐
No gas leaks ☐
Ashes kept in metal containers ☐ Hot pipes clear of combustible materials ☐

NSC SAFETY INSTRUCTION CARD No. 237.

Placing Extinguishers

An extinguisher may be useless if an employee must spend valuable minutes looking for it, or if it is blocked by piles of materials.

Here are 6 recommended rules:

1. Locate extinguishers close to fire hazards but not in the fire zone should fire occur.
2. Place extinguishers so access will not be blocked by fire.
3. Install enough extinguishers to deal with any expected blaze, considering the rapidity with which it might spread, intensity of heat, etc.
4. Mark locations conspicuously.
5. Identify each unit for the type of fire it is designed to combat.
6. Protect extinguishers from traffic.

Marking locations. Contrasting backgrounds make extinguishers conspicuous and less likely to be overlooked in the excitement of a fire. Here are 4 methods:

1. Paint a large red or white background on the wall.
2. Paint a large red spot on the floor under the extinguisher.
3. Paint vertical red bands with yellow borders down a wall or column where equipment is placed.
4. Provide lights of distinctive color which do not conflict with exit lamps. * * *

How Many Extinguishers?

THE NUMBER of first-aid fire extinguishers for any occupancy should be determined by the jurisdiction having authority. Recommendations are based on the potential severity of any incipient fire. Factors include:

1. Rapidity with which a fire may spread.
2. Intensity of heat that may be developed.
3. Accessibility of fire.

Special hazards, in addition to ordinary hazards of the occupancy, require installation of additional and/or substitute units of prescribed type.

Methods of determining the number and type of extinguishing units required will be found in NFPA No. 10. Classification of fire extinguishers under both old and new methods will be found in the accompanying table.

Requirements as outlined in NFPA No. 10 are based on the provision of Class A extinguishers. Supplemental Class B or Class C units are to be provided

—*To page 232*

Weeds are a hazard you can't afford . . .

Get rid of them with Baron, Radapon and other Dow products

Does the man in the photo strike you as a safety man? Well, he is. He's eliminating a fire hazard by spraying weed and grass killing Baron® along the fence line.

Many maintenance men are apt to forget about the dangers of weeds and nuisance grasses around a plant. Aside from being a fire hazard, excess vegetation obscures vision around security fences, hides outside valves and pipes, clogs drainage ditches. Weeds make the footing dangerous in parking lots and along railroad sidings. And they give the whole plant a run-down, unattractive look.

Now, there's an easy way to get rid of weeds and nuisance grasses. Spray with Dow vegetation control chemicals. Baron, Radapon® and other Dow products control unwanted vegetation. They're inexpensive and easy to apply. Your own maintenance men can spray away your problems, or professional contractors can be hired to do the job at small cost.

We'll send you, upon request, the name of a qualified Dow distributor nearest you.

Write today for free literature on industrial vegetation control. THE DOW CHEMICAL COMPANY, Agricultural Sales Department, Midland, Michigan.

YOU CAN DEPEND ON DOW

Circle Item No. 173—Reader Service Card

ROCKWOOD built-in proportioning systems for industrial and refinery fire trucks

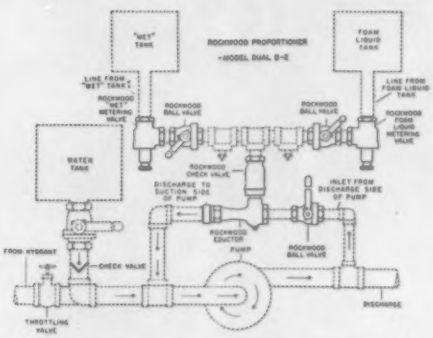
Rockwood-equipped refinery fire truck with Balanced FOAM Proportioning system utilizing ratio flow controller offering simultaneous FOAM and water application. Notice Rockwood's direct manual FogFOAM turret nozzle with single FOAM shaper and screen.

Rockwood's new Double Strength FOAM and Rockwood WET offer you many advantages

Double Strength FOAM has double foam-making capacity, cutting in half the transportation cost and storage space. It is faster spreading and flows freely — even at subzero temperatures. An outstanding FOAM liquid to go with Rockwood's advanced type of FogFOAM and FOAM Nozzle for quickly putting out fires in gasoline and other similar flammable liquids. Available in 5 gallon cans or 50 gallon drums.

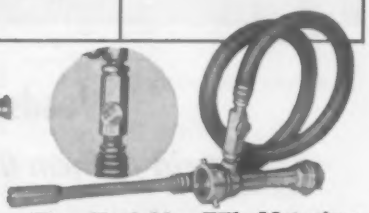
Rockwood WET increases the spread and penetration of water into deep seated fires involving ordinary combustibles such as wood, paper, cloth, etc. It greatly reduces the water needed to extinguish such fires. Available in 50 gallon drums, 5 gallon and 1 gallon cans.

Regular FOAM and All Purpose FOAM are also available.

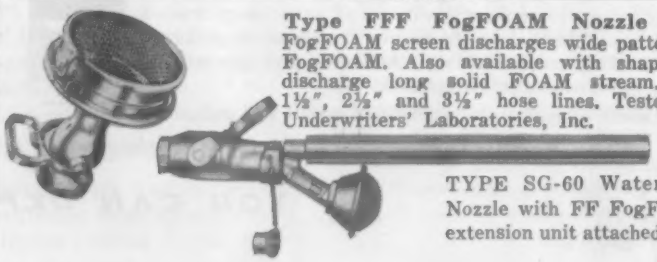


Proportioning System. Model B-2, around-the-pump proportioner. Used when pressure is maintained by pump. Custom-engineered systems are also available.

The F-501 Nozzle developed for use with 1½" hose to provide an economical means of applying a solid stream of FOAM on flammable liquid fires.



The Variable FW Metering-Check Valve with FW Eductor incorporates both the Metering Valve and Ball Check Valve in one unit and meters liquid into the hose line in any proportion from 1% through 6%.



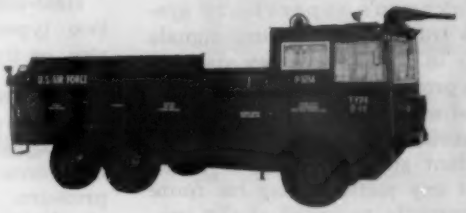
Type FFF FogFOAM Nozzle with FogFOAM screen discharges wide pattern of FogFOAM. Also available with shaper to discharge long solid FOAM stream. For 1½", 2½" and 3½" hose lines. Tested by Underwriters' Laboratories, Inc.

TYPE SG-60 WaterFOG Nozzle with FF FogFOAM extension unit attached

Rockwood offers you 4 types of turret control

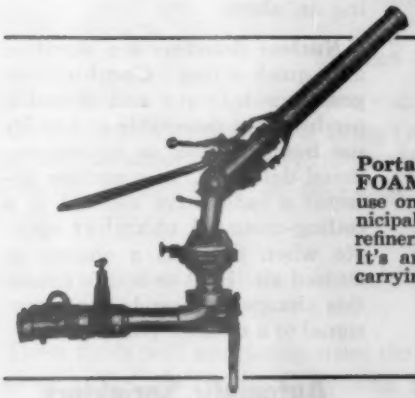
...and any Rockwood turret gives you 4 types of discharge (1) FogFOAM, (2) Solid FOAM stream, (3) WaterFOG,(4) Solid water stream

Remote Hydraulic Control Single Type FFF FogFOAM Turret Nozzle on Type 0-10 U. S. Air Force crash rescue fire fighting truck. Similar turrets can be supplied for oil refineries, chemical and industrial plants and municipalities. Hydraulically operated dual turrets also available.



Remote Manual Control Turret Type FFF FogFOAM with two Ground Sweep Nozzles and two Hand Line Nozzles with FF Extensions, a Piercing Applicator and a Type D Proportioner for Rockwood FOAM and WET provide this New York State Thruway Authority truck with extra fire fighting equipment. The truck was built by Young Fire Equipment Corp., Buffalo, N. Y.

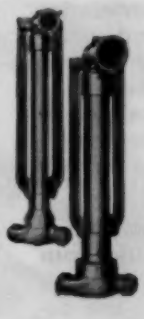
Direct Manual Control Dual Type FFF FogFOAM Turret Nozzles — can be operated directly by firemen from cab roof.



Portable Type FFF FogFOAM Turret Nozzle for use on fire hose lines by municipal fire departments, oil refineries and industrial plants. It's arranged for convenient carrying on fire trucks.

WaterFOG Equipment

Type SG-48 WaterFOG Nozzle. Easy to handle. Discharges high or low velocity WaterFOG or straight water stream.



Lightweight Rotating Cellar and Attic Pipe. Fights fires in cellars, attics, under piers, bridges, etc.

Type N22 WaterFOG Nozzle. Discharges high velocity WaterFOG. For general use around live electrical equipment.

Type N23 WaterFOG Nozzle with Swivel Handles. Discharges high velocity WaterFOG with higher discharge and greater range than Type N22 Nozzle.

ROCKWOOD

ROCKWOOD SPRINKLER COMPANY

Engineers Water . . . to Cut Fire Losses

PORTABLE FIRE PROTECTION DIVISION

2050 Harlow Street, Worcester 5, Massachusetts

Distributors in all principal cities

Circle Item No. 174—Reader Service Card

Automatic Protection

Detection and alarm systems, automatic sprinklers

FIRE PROTECTION uses both the human element and automatic devices. The complete program trains employees in fire-fighting methods and employs plant guards and watchmen to patrol the property.

It also backs their skill and vigilance with automatic devices for detection, warning, and extinguishment and provides supervisory systems for watchmen.

An alarm system may range from coded blasts on the factory whistle to an elaborate automatic system.

Sirens or special whistles are often used to avoid confusion with the regular whistles.

Where the municipal fire department is available, an alarm box may be located near the plant entrance or in one of the buildings. Auxiliary boxes may be placed at strategic points.

A direct connection to the nearest fire station offers added protection. Such a system may be operated manually or by a water alarm device.

Supervisory Systems

Watchmen's supervisory systems transmit and record signals made at watchmen's key stations. This protection is frequently combined with fire-alarm systems and supervision of sprinkler systems. A plant guard's failure to check in at any station along his route is promptly recorded at the control desk or panel.

Such supervision has checked many incipient fires, prevented robberies, and brought aid to watchmen rendered helpless by accident or illness. It has also prevented sprinkler-caused water damage.

These operate on three main plans:

1. **Central station system.** Signals are transmitted to an independent central station where they are recorded and proper action for the emergency taken. The central station may serve several companies.

2. **Proprietary system.** Similar to a central station but controlled and operated by the owner of the protected property.

3. **Local system.** Owned and operated by the protected company but does not have an operator constantly on duty at a central station.

NERVE CENTER of National Cash Register's fire protection is this central station. Operator makes notation of each call. Above switchboard is directory from which he can determine location of fire when alarm comes in.

Detectors and Alarms

Automatic detection and alarm devices may be operated by heat or smoke.

Heat-actuated systems are of two types: Temperature-rate-of-rise, or fixed-thermostat.

Temperature-rate-of-rise systems operate on the principle that air expands when heated. Tubing contains air at atmospheric pressure. Heat of fire expands air, forcing it to travel in opposite directions to diaphragms which close and sound alarm. Features in design prevent false alarms from normal temperature changes or even short sudden surges of heat.

Fixed-temperature thermostats are set for some specific temperature well above normal. When room temperature reaches that level, an alarm is sounded.

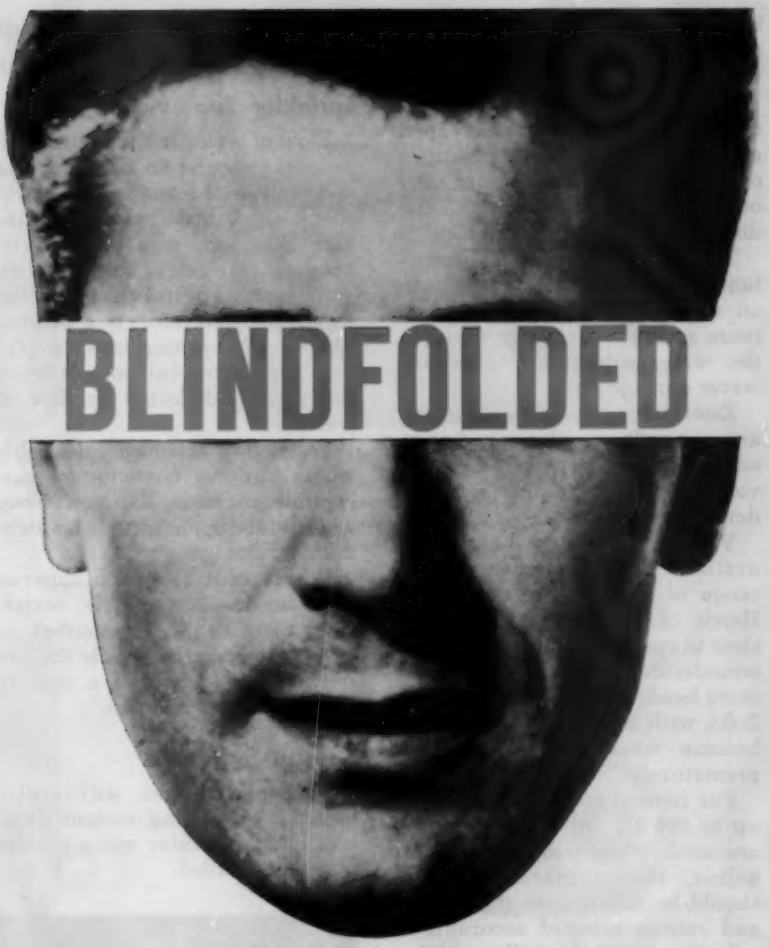
Smoke detectors detect deep-seated smoldering fires and give a signal before flames are visible. Continuous samples of air are drawn from protected spaces and passed through an analyzer tube. Here smoke passes through a beam of light. Smoke reflects light on to photoelectric cells, increasing the cell output and sounding an alarm.

Nuclear detectors are sensitive and quick-acting. Combustion generates minute and invisible products not detectable at first by the human senses or by conventional detectors. In a nuclear detector a radioactive element in a ceiling-mounted chamber operate when there is a change in ionized air. Heat or smoke causes this change and sends the alarm signal to a monitor panel.

Automatic Sprinklers

FIXED SYSTEMS, particularly automatic sprinklers, are rated as the No. 1 defense against fire. They are needed wherever a building or its contents provides an appreciable amount of combustible material. Even fireproof

You Wouldn't Buy Hydraulic Fluids



only Houghton supplies all types—can give you unbiased recommendations.

Operating pressures and temperatures, pump and equipment design and degree of fire hazard all affect the selection of the right fluid.

Phosphate-Ester Fluids—Houghto-Safe 1000 Series

These fluids are available in three viscosities to meet the needs of systems running as high as 150°F., and where maximum lubricity is needed for heavy bearing loads. Used in deck-edge elevators in Navy carriers.

Water-Glycol Fluids—Houghto-Safe 600 Series

These fluids will adequately meet the requirements of up to 85% of all hydraulic systems. Houghto-Safe 600 series provides maximum fire protection with good lubricity for systems running up to 150°F. Used in catapults in Navy carriers.

Water-Oil Emulsion Fluids—Hydrolubric F.R.

These are lower cost fire-resistant fluids. They are stable, afford good lubricity and provide adequate fire protection where hazards are intermittent or remote.

When you think of fire-resistant hydraulic fluids—call on Houghton. You will get factual, unbiased recommendations of the fluid best suited to your equipment and degree of fire hazard. Factual folders describing these safe fluids are yours for the asking. Write E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

HYDRAULIC FLUIDS . . . **products of**

E F HOUGHTON & CO.

PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

Circle Item No. 175—Reader Service Card

buildings need protection for combustible contents and to prevent structural damage.

Sprinkler heads should be located not only to protect open areas but also under wide benches or tables, in closets, dryers, and other locations shielded from the discharge of ceiling sprinklers.

This extra coverage is important because heat from a fire in an unprotected area would open more sprinklers, causing drain on the water supply and excessive water damage.

Essential parts of a sprinkler are a nozzle, a releasing device, and a deflector. The releasing device in most sprinklers is a soldered link element.

Various types of heads are available for use under a wide range of temperature conditions. Heads of too high a rating are slow to operate. A fire would gain considerable headway and open more heads than needed. Soldered links with too low a rating may become weakened and operate prematurely.

For normal room temperatures up to 100 F., ordinary sprinklers are used. When temperatures are higher, thermometer readings should be taken near the ceiling and ratings selected accordingly.

In the few cases where sprinklers have failed to function when needed, the fault has rarely been due to the sprinkler mechanism. Deficient water supply, freezing, defective dry-pipe valves, foreign material in the system, corrosion, obstruction of sprinkler heads by stock piles, or paint on sprinkler heads are among the causes.

Wet-pipe systems are used for most installations. Water to sprinkler heads is maintained under pressure and operation is immediate. This type requires protection against freezing.

Dry-pipe systems are used where there is danger of pipes freezing. Instead of water, air under pressure is maintained in the pipes. Opening of a sprinkler head releases air pressure, resulting in operation of a valve admitting water to the system. There is a slight delay between opening of sprinkler head and discharge of water.

After a fire, sprinkler heads should be replaced promptly.

Sprinkler Supervision

Flow of water in the system can be used to sound an alarm for fire and accidental leakage. The alarm check valve installed in a sprinkler riser can ring a hydraulic gong or an electric bell, or both.

A less expensive type, the water-flow indicator, is a paddle-like vane projecting into the piping. An electric bell sounds when the vane is deflected by flow of water.

Water-flow alarms are desirable where building contents are susceptible to water damage. They are useful supplements to watchman service.

Where central station supervisory service is available, water-flow alarms are transmitted to headquarters, which calls the fire department and sends a man to the plant to investigate.

Special Systems

For special risks, automatic systems employing carbon dioxide, foam, or water spray nozzles may be installed.

LIFE and property depend on the plant protection forces. Added security is had by central supervisory systems.

Carbon dioxide is desirable where the system operates in an enclosed space and value of contents is high and subject to water damage. Carbon dioxide can be discharged either manually or automatically by means of heat-actuated devices.

Devices also close shutters, doors, windows, and dampers and stop blowers to confine the extinguishing gas. These systems are suitable for spaces containing electric equipment or flammable liquids.

Foam installations are suitable for tanks and operations involving flammable liquids, but not for electric fires. They usually operate automatically, with provision for manual operation.

Water spray systems are used to protect oil-filled electric equipment, such as transformers, oil switches, and oil piping and open tanks of flammable liquids. Water-spray systems require expert installation.

Other systems for limited and specialized occupancies use vaporizing liquid, steam, and inert gases. For processes like paint dipping and tank operations using flammable liquids a manually or automatically operated cover is an effective means of extinguishment.

Obstructed Piping

A plant's fire protection may be crippled in an emergency when scale, stones, or other foreign material become lodged in the sprinkler system. Should a fire occur, discharge from the sprinkler heads would be insufficient to check the blaze.

Regular examinations can determine whether the system contains an excessive amount of foreign material. Methods include observations of flow from the test connection on top of the system, drain tests at sprinkler risers, or hydrant flow tests.

Uncoupling piping at strategic points and examining the interior, or test flushing representative feed or branch lines, will reveal obstructions. Examination may show individual sprinklers to be clear, but that does not necessarily mean the branch lines are. * * *

LOOK . . . AT THIS EASIER, THRIFTIER WAY TO STOP WEEDS

COMPARE THE RATE—Enough UREABOR weed killer to treat 12 square feet is held in this hand! Consider the convenience and economy afforded by a rate of application as low as 1 lb. per 100 square feet of area.

COMPARE THE EASE—Applying UREABOR weed killer is as easy as walking! By actual test, one man spreading this granular material *dry* with the PCB Spreader can cover a given area in less time than can a two-man spray crew.

COMPARE THE RESULTS—The killing effect of UREABOR continues throughout a season or more! A single application can mean a weed-free surface. Plants from coast to coast are using UREABOR to get the lasting control it provides.

COMPARE THE COSTS—UREABOR kills weeds for pennies; saves you dollars! It is low priced . . . your initial outlay is small. Further economy comes from low rates of application, savings of man-hours, and convenience in handling and storage.

COMPARE... 20 MULE TEAM UREABOR® WEED and GRASS KILLER

The PCB Spreader applies Ureabor quickly and uniformly at low rates. It holds enough Ureabor to treat up to 2500 sq. ft. without refilling. Available for $10.75 delivered—anywhere in U.S.A.

UREABOR invites comparison with all other weed killers from any standpoint. What is your gauge of measurement? Is it EFFECTIVENESS? . . . SAFETY? UREABOR is effective and safe in every respect. It is *nonflammable, noncorrosive* to ferrous metals, *nonpoisonous* when used as directed. No product is easier to apply . . . there is nothing to mix; no water to haul. Check all the advantages of UREABOR and you'll agree that it stands alone. Write for literature.

AGRICULTURAL SALES DEPARTMENT

United States Borax & Chemical Corporation

PACIFIC COAST BORAX COMPANY DIVISION

630 SHATTO PLACE, LOS ANGELES 5, CALIFORNIA

Circle Item No. 176—Reader Service Card

Training Fire Fighters

ORGANIZATION and training pay off when the need arises. Men who have been drilled until the right procedure becomes automatic can be expected to perform their duties under stress.

Preparedness requires thorough inspections, competent maintenance, and expert supervision of equipment and men.

Fire protection in many plants is a responsibility of the safety department. Even in larger plants where there is more specialization the safety department has an important part in the program.

Functions of an employee fire safety organization are threefold:

1. To detect and correct fire hazards—to prevent fire before it starts.
2. To maintain fire equipment for efficient action.
3. To become proficient in use of extinguishers and other fire-fighting methods.

Any fire-protection program should function 24 hours a day.

The fire-fighting organization may consist of a few trained employees with hand extinguishers or it may be a company fire department with full-time personnel. Regardless of its size, the municipal fire department should have a prominent place in plant protection plans.

City firemen should be familiar with the plant layout, its fire-fighting resources, and its hazards. They can also help in training and equipping the company's fire fighters.

A plant should not depend on the city fire department alone. Even under favorable conditions, it takes time for outside apparatus to reach the fire, and in many emergencies, the department might be busy elsewhere.

Civil defense. The plant protection force should also be trained to take part in civil defense activities and peace-time emergencies. In many disasters where communities have suffered from wind, flood, and fire, industrial protection and medical resources have rendered notable service.

Fire squads may consist of 5 or 6 men in each department. They act as inspectors, reporting and, where possible, correcting fire hazards. They should be taught the use of first-aid extinguishers by actual demonstration on small fires. They should also be impressed with the importance of turning in alarms promptly.

Trained men on the job will put out many fires before serious damage results and also help prevent panic.

Fire brigades. For larger plants, hydrants and hose systems are basic protection. Trained men are needed to use them. Members of department squads can be members of the plant fire brigade.

These men should be familiar with the plant, its protective systems and water supplies. They should be drilled frequently by handling hose streams—no job for an amateur.

Each man should have a definite task. Some should be assigned to protecting goods and machines from water damage.

Fire departments. Some plants have full-time motorized fire departments. The department supervises the plant protection program and is trained in specialized fire-fighting methods.

Watch service. Watchmen are indispensable in protecting industrial property. They discover and correct fire hazards, detect outbreak of fire, extinguish incipient fires, and summon help when needed.

The watchman should be a mature, able-bodied man who is loyal and dependable. When the regular working force is absent, the safety of the plant may depend on him.

The watchman should be familiar with all parts of the fire protection system, including sprinkler systems, drains, and fire pumps. He should know how to operate extinguishers.

Recorded hourly rounds are recommended. Approved watchclock or supervisory systems record calls at each station.

Many fires occur just after a plant has closed down. The watchman should make his first round immediately after operations have stopped.

Types of Fires

Fires have been classified by underwriters and manufacturers in three main groups.

Class A. Fires in ordinary combustible materials, such as wood, paper, textiles, and rubbish. They require quenching or cooling effects of water or solutions containing large proportions of water.

Class B. Fires in flammable liquids, such as gasoline, solvents, oil, grease, paint, varnish, and lacquers, where blanketing or smothering effect is essential.

Class C. Fires in electric equipment, such as motors, generators, and switch panels. These require a nonconductive extinguishing agent.

Fires in motor vehicles, aircraft and motorboats have the same problems of extinguishment as Class B but equipment must be portable. Extinguishing agents must be nonfreezing.

Training Fire Fighters

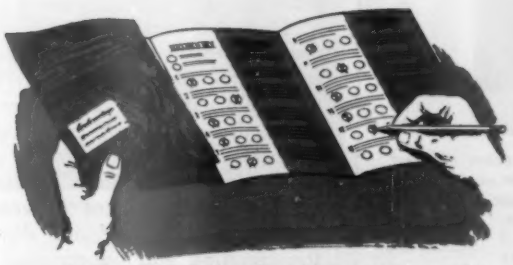
Essentials of training, as recommended by the National Fire Protection Association, are:

1. Officers and firemen should be kept fully informed on all phases of fire prevention and extinguishment. They should be encouraged

Circle Item No. 177—Reader Service Card

Stop explosions before they blow

Send for the CROUSE-HINDS "Hazard Finder"



● The Hazard Finder will enable you to make a quick survey of the hidden probabilities of electrically-ignited explosions in your plant.

Let Crouse-Hinds equipment and technical assistance help you to prevent electrically-ignited explosions.

The more than 15,000 Condulet ® items in the Crouse-Hinds line, include the world's widest selection of explosion-proof and dust-tight electrical equipment. There are Condulet devices for every circuitry requirement, and for every hazardous area and condition. All backed by engineers and technicians thoroughly familiar with Article 500 of the National Electrical Code and its application to specific situations.

For a quick, general survey of probable dangers in your plant, send for the Hazard Finder. For technical discussion of specific areas and hazards, write for Crouse-Hinds bulletins which apply.

● Or for personal assistance, ask any of the offices listed below to send a Field Engineer.

FREE

CROUSE-HINDS CO.
Syracuse 1, N. Y.

I want to check my plant. Send me your Hazard Finder.

Name_____

Company_____ Title_____

Address_____

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CROUSE HINDS

MAIN OFFICE AND FACTORY: SYRACUSE, NEW YORK
Crouse-Hinds Company of Canada, Ltd., Toronto, Ont.

● CONDULET® ELECTRICAL EQUIPMENT (Explosion-Proof and Conventional) ● FLOODLIGHTING
● TRAFFIC CONTROL SYSTEMS ● AIRPORT LIGHTING and WEATHER MEASURING EQUIPMENT

These products are sold exclusively through electrical distributors. For application engineering help, contact one of the following offices: Baton Rouge Birmingham Boston Buffalo Chicago Cincinnati Cleveland Corpus Christi Dallas Denver Detroit Houston Indianapolis Kansas City Los Angeles Milwaukee New Orleans New York Philadelphia Pittsburgh Portland, Ore. Salt Lake City St. Louis St. Paul San Francisco Seattle Tulsa Washington **Resident Representatives:** Albany Atlanta Baltimore Charlotte Chattanooga Jacksonville Reading, Pa. Richmond, Va. Shreveport

to attend drill schools of the local fire department, or a fire college. Books, pamphlets, and magazines are available. The rapid development of industry constantly brings new fire hazards and extinguishing methods.

2. Drills should be held at least twice a month during paid time. Location of drills should be changed each time, so that men will become familiar with all conditions and areas of the plant and be able to cover any emergency that may arise.

3. Drills should include making hose connections with hydrants, unreeling and stretching hose without kinks, coupling and uncoupling, attaching play pipes, carrying hose up ladders, over roofs and through the interior of the building.

As a general rule, water should be turned on for all outdoor practice work, except during freezing weather. (This assumes rubber-lined hose; unlined linen hose should not be wet.)

4. Drills should be disciplined, moderately paced, and accurate.

5. Members of the brigade should be examined regularly to make sure they know the location of fire alarm boxes and the meaning of various fire alarm signals. * * *

Where to Smoke?

Smoking is a problem wherever people are employed, both from the standpoint of fire hazards and time taken off the job. But the habit is widespread and must be considered from the industrial relations angle as well as safety.

Where flammable materials are handled, smoking cannot be permitted. Where no fire or explosion hazard exists, management, supervision and workers can work out details.

Prohibiting smoking is not always the cure. Employees may sneak a forbidden smoke, perhaps in a hazardous spot.

A smoking area near the work place, with reasonable time for relaxation, has been the answer in many plants. Supervision is needed to prevent the relaxation from being overdone.

Receptacles for disposing of cigaret butts and pipe ashes should be placed at the entrance to any department where smoking is not allowed. In some hazardous areas employees must check matches and materials as they enter.

Chewing tobacco, while free from fire hazard, is objectionable from cleanliness and hygiene standpoints because of the inevitable accompaniment of spitting. In operations such as food processing, where scrupulous cleanliness must be observed, chewing tobacco is not allowed.

Cuspidors, a necessary evil, should be provided and cleaned regularly. Disposable cuspidors have obvious advantages in maintaining housekeeping. * * *

TOKHEIM High-Vacuum
HAND PUMPS
for industrial liquids

Here's an all 'round utility pump that saves much more than its cost in speeding production, improving housekeeping, preventing waste. Eliminates slippery floors and liquid accumulation so often the cause of fire and accidents. Delivers 20 gallons per 100 back and forth strokes. Pumps oil and many other liquids. (Write for approved list.) Has hose or spout outlet. Call your dealer, your Tokheim representative, or write factory.

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Circle Item No. 178—Reader Service Card

Wetting Agents

Added to water, wetting agents increase its penetrating power on burning materials. This "wet" water has proved effective in extinguishing fires in loosely packed materials such as cotton bales, peat, hay, and decaying leaves in forests. The needed penetrating action cannot be obtained by the velocity of a stream of ordinary water.

Wetting agents break down the surface tension that holds the film of water together. The solution has unusual spreading and penetrating qualities and it also is absorbed more quickly by solid materials and adheres to them more readily.

Wetting agents may be applied effectively and used with all types of standard fire apparatus where plain water is normally used.

Approved wetting agents are no more corrosive than plain water to steel, bronze, and copper. For continuous storage, such materials as cast iron, zinc, galvanized iron, die-cast alloys, and painted surfaces should be avoided. Wetting agents, although not corrosive, may accelerate corrosion due to the cleaning and penetrating action which penetrates and loosens unbonded coatings which are not baked on.

Detailed information will be found in National Fire Protection Association's Standard No. 18, *Wetting Agents.*

Wetting agents which meet requirements of the standard are listed in Underwriters' Laboratories *Fire Protection List.*

INFORMATION FOR SAFETY DIRECTORS

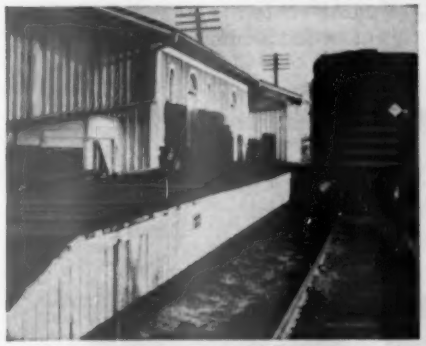
about improved products and new services made possible by DU PONT CHEMICALS

Safe, efficient removal of scale from industrial equipment is one of the many uses of new *dry-type* acid cleaners based on Du Pont Sulfamic Acid. These mix-with-water acid cleaners do away with spilling hazards of liquid acids . . . have low corrosive action. They're available now from several suppliers.

HERE are ways you can get *extra value* for your purchasing dollar. These modern products, which bring new safety and efficiency to your operations, are made possible by Du Pont Chemicals used in their production.

The three shown here are examples of many new and improved products in which Du Pont Chemicals play a part. Ask your regular suppliers about them, or send the coupon below to get more information, including names of manufacturers from whom these products can be obtained.

Work clothes resist fire when treated with Du Pont "X-12" Flame Retardant. Clothes "breathe" freely, feel comfortable. Colors remain bright and good-looking. Industrial and commercial laundries apply "X-12" in an economical, one-step operation after each laundering.



Long-term protection against fire, termites, decay is assured when lumber is treated with Du Pont Chromated Zinc Chloride. CZC is applied in one low-cost treatment... permeates wood fiber. Treated lumber is clean, odorless, paintable. Du Pont does not treat wood. Service is available from lumber treaters.

DU PONT
Grasselli Chemicals

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER L'VING . . . *THROUGH CHEMISTRY*

Send for your free copy of the new **"INFORMATION FOR INDUSTRY"**

Specially prepared for Safety Directors . . . a complete packet of information on 9 products and services, including names of manufacturers of each. Yours for the asking . . . just fill out the coupon.

E. I. du Pont de Nemours & Co. (Inc.)
Grasselli Chemicals Dept., Room N-2533-S
Wilmington 98, Delaware

Please send me your new folder, "Information for Industry."
I'm particularly interested in the items checked:

☐ dry acid cleaners ☐ fire-retardant treatment ☐ wood protection

NAME_____

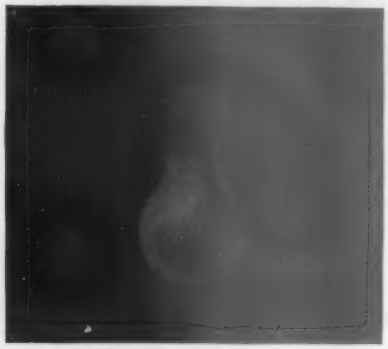
FIRM_____

ADDRESS_____

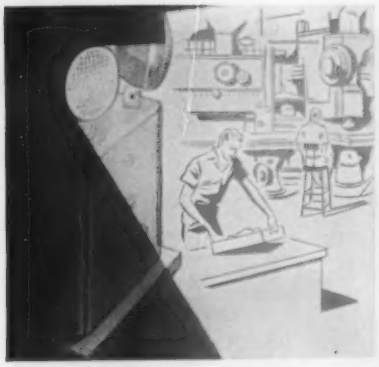
CITY_____ ZONE_____ STATE_____

Circle Item No. 179—Reader Service Card

When power fails and lights go out



Exide Lightguard® goes on—automatically



CAN SAVE YOU $1000's

Here's low-cost protection against panic, injury to personnel, damage to valuable machines. Every industrial building that needs light needs Exide Lightguard. Then if regular lights go out, Exide Lightguard goes on—automatically. Free bulletin gives full details. Send coupon.

Exide® INDUSTRIAL DIVISION
The Electric Storage Battery Company, Phila. 2, Pa.

Send me the bulletin on Exide Lightguard emergency lighting units.

Name_____

Company_____

Street_____

City_____ Zone____ State_____

18

Circle Item No. 180—Reader Service Card

Extinguishers

—*From page 220*

where blanketing or nonconducting extinguishing agents are necessary.

Following is a summary of recommendations for occupancies of varying severity:

Class I—Light hazard. Relatively small amount of combustibles, with incipient fires of minimum severity anticipated.

Examples: Office buildings, schools (exclusive of trade schools and shops) and public buildings. Limited areas within such buildings containing ordinary hazard occupancies are to be protected as required under Class II.

Class A extinguishers shall be provided throughout, so located that a person will not have to travel more than 100 ft. to reach the nearest device. At least 1 unit of extinguishing capacity shall be required for every 2,500 sq. ft. of floor area.

Class II—Ordinary hazard. Incipient fires of average severity may be anticipated.

Examples: Department stores, warehouses, and manufacturing buildings of average hazard.

Class A extinguishers shall be provided throughout, so located that a person will not have to travel more than 50 ft. to the nearest device. At least 1 unit of extinguishing capacity shall be required for every 1250 sq. ft. of floor area.

Class III—Extra hazard. Because of character or quantity of combustibles, extra severe incipient fires may be anticipated.

Class A extinguishers shall be provided throughout as specified for ordinary occupancies, with additional Class B and/or Class C extinguishers to be provided at the discretion of the authority having jurisdiction.

Examples: Woodworking, spray painting, and dipping.

Special provisions of NFPA No. 10 relate to occupancies requiring Class B and Class C extinguishers. * * *

Look for the Label

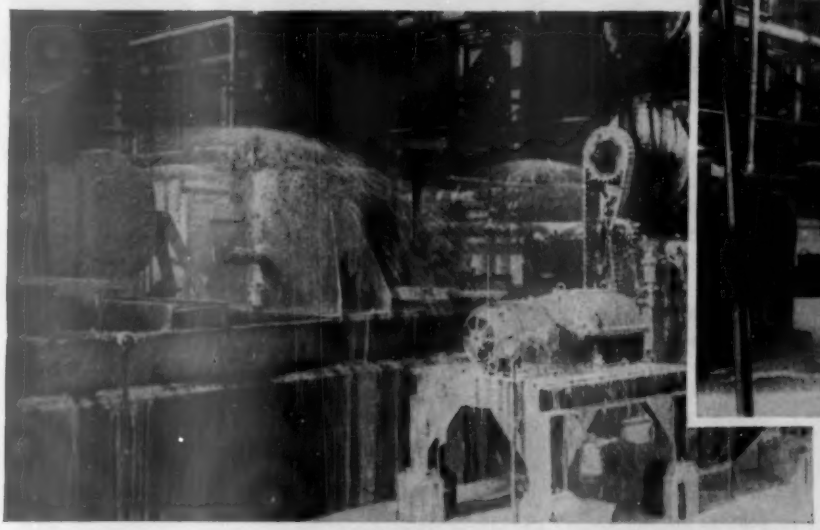
Approved extinguishers carry the label of Underwriters' Laboratories or Factory Mutual Laboratories. They also carry this information:

1. Type of extinguisher.
2. Type of fire for which it is recommended (Class A, B, or C).
3. Instructions for use.
4. Unit rating.
5. Instructions for inspection and recharging.

An approved extinguisher must have adequate capacity. The vaporizing liquid type, for example, must contain not less than 1 qt. of extinguishing agent. * * *

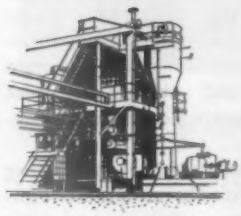
FIREMEN with hand extinguisher trucks equipped for different types of fires. One is on hand at every welding job. (National Cash Register Co.)

Tough Fire Protection Problem Solved by GRINNELL



▲ Grinnell ProtectoFoam safeguards the lower section of hexane solvent extraction unit with a blanket of foam, to prevent formation of explosive mixtures.

▲ Grinnell ProtectoSpray on upper part of unit cools equipment and washes burning oil and solvent into area protected by foam blanket below.



At Canadian Vegetable Oil Processing Ltd., Hamilton, Ontario, hexane solvent is used in extracting vegetable oil from soybeans. Because of the highly flammable nature of the solvent, Grinnell designed a special system for this unit, consisting of 162 ProtectoSpray nozzles — to drench the superstructure with fine water spray; and 24 ProtectoFoam spray heads — to blanket the diked area with foam. This water-foam combination protects the lives of personnel, as well as shielding equipment from costly damage.

Solving tough fire problems like this with installations engineered to the hazard, tailored to the need, built of highest quality materials is something Grinnell has been doing successfully for more than 85 years. Check the list below for the Grinnell System suited to your requirements. Or, tell us about the fire hazard you face, and let us suggest the proper installation for you. Grinnell Company, Inc., 277 West Exchange Street, Providence, Rhode Island.

Grinnell Fire Protection Systems include:

- Automatic spray sprinklers — wet pipe, dry pipe, Simplex, and deluge systems
- Emulsion and vapor dilution extinguishment with water sprays — Mulsifyre and ProtectoSpray systems
- Cooling, insulation and controlled burning with water sprays — ProtectoSpray systems
- Mechanical foam blanket — ProtectoFoam systems
- Carbon dioxide systems
- Dry chemical systems

Manufacturing, Engineering, and Installation of Fire Protection Systems since 1870

Circle Item No. 181—Reader Service Card

national's non-toxic VEG-OUT destroys weeds

National's non-toxic VEG-OUT is a non-selective weed killer—it will attack all vegetation. Liquid VEG-OUT is safe to use around humans or animals. Sprayed on the surface of the earth, it is carried into the soil by rain or water and absorbed by the roots of growing or dormant vegetation. The roots die and the entire plant is permanently destroyed. VEG-OUT can be applied by hand or mechanical sprayer at any season of the year. Use VEG-OUT to rid your soil of undesirable vegetation.

A PRODUCT OF NATIONAL RESEARCH

national
DISINFECTANT COMPANY
2417 Commerce, Dallas
906 S. Seventh, St. Louis

Circle Item No. 182—Reader Service Card

Flammable Liquids

FLAMMABLE LIQUIDS, as defined by the National Fire Protection Association, are those which give off flammable vapors at or below 200 F. They are divided into three classes:

Class I. Below 20 F. Ethyl ether, acetone, carbon disulfide, gasoline, benzol, collodion.

Class II. 20 to 70 F. Amyl acetate, ethyl alcohol, toluol, ethyl acetate, varnish.

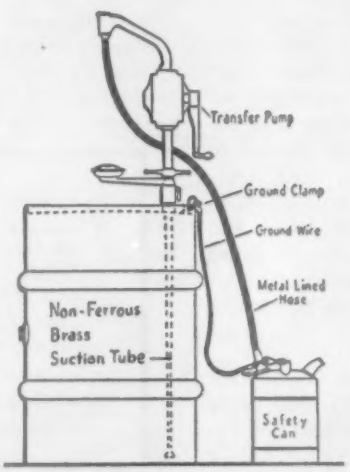
Class III. 70 to 200 F. Stoddard solvents, kerosene, amyl alcohol, creosote oil, turpentine, fuel oil.

The flash point of a liquid is the lowest temperature at which it gives off enough vapor to form explosive mixtures with air which are capable of propagating flame when ignited.

Portable containers. Safety cans, painted red, with self-closing spouts and flame-arresting screens should be used for Class I and Class II liquids.

If several varieties of liquid are handled in a department, stripes or distinctive lettering should be placed on the can to prevent accidental mixing.

The following labels are recommended:



SAFEGUARDS in handling flammable liquids: ground wire with clamps connects drum and container during filling; improved pumps are self-priming and equipped with flame arresters and protected openings for pressure and vacuum relief.

EXPLOSION-PROOF lamp and switch for hazardous atmosphere of paint booth. Booth is also protected by automatic sprinkler system.

1. *Flash point below 20 F.*—DANGER!—EXTREMELY FLAMMABLE—Keep away from heat, sparks, and open flame. Keep closed when not in use.

2. *Flash point 20 to 80 F.*—WARNING! FLAMMABLE—Keep away from heat, sparks and open flame. Keep closed when not in use.

3. *Flash point 80 to 150 F.*—CAUTION! COMBUSTIBLE—Keep away from heat and open flame. Keep closed when not in use.

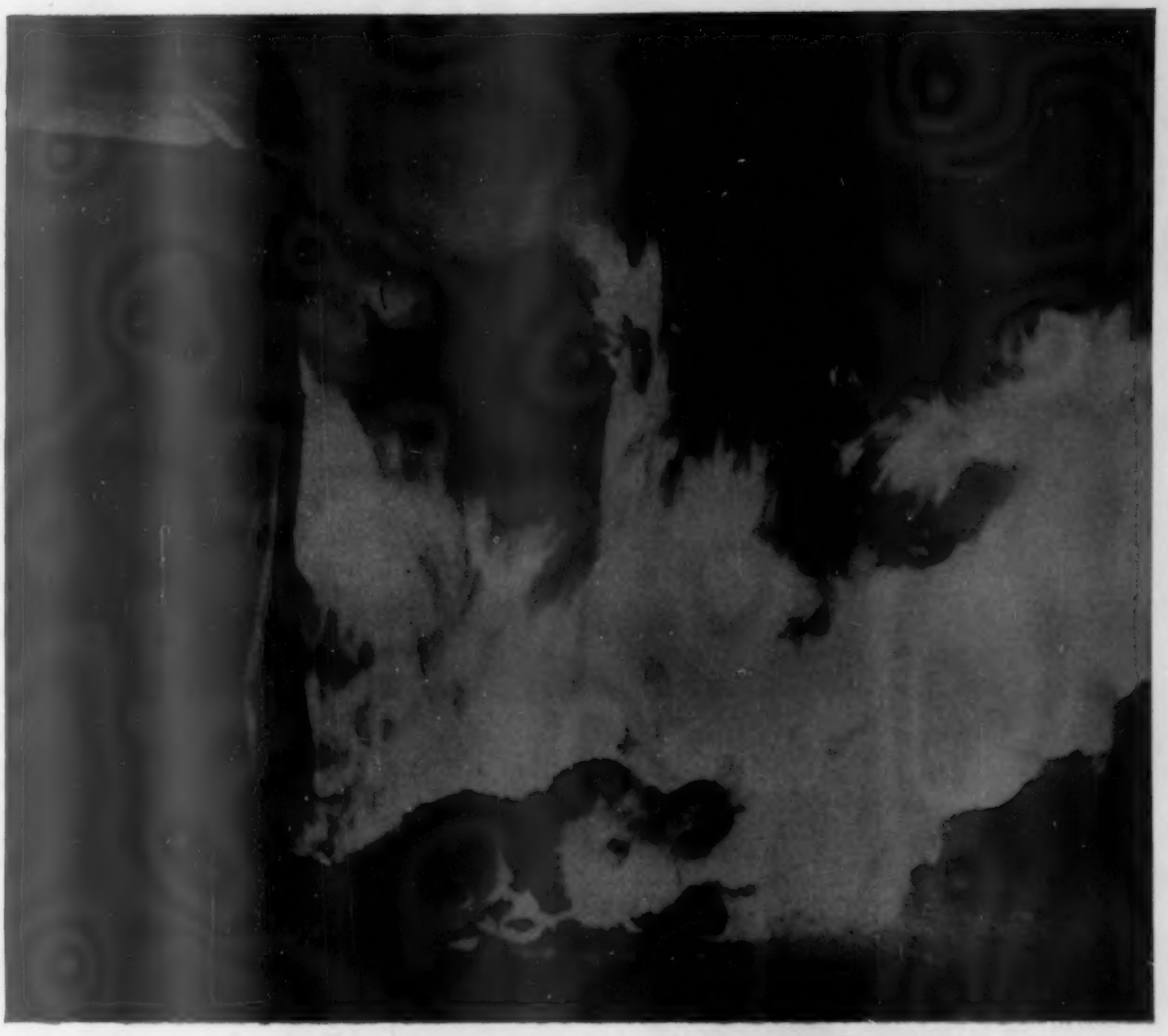
Static electricity. Points of danger are at the outlet of a flammable liquid fill pipe, at a delivery hose nozzle, near an open container, and around a tank truck fill opening or barrel bunghole.

To prevent static sparks during filling, a wire bond should connect storage container and container being filled. The bonding wire or receiving container should be grounded.

Tank cars, storage tanks, tank trucks, connecting pipes, and hose lines and filling nozzles should be interconnected with bonding wire before attempting to open connections during loading or unloading.

When pouring from one container to another, the lip of one container should rest on the edge or lip of the other. The receiving vessel should rest on a grounded surface. The two should be kept in contact during pouring.

Storage tanks above ground, not in contact with moist earth



Ever see a man burned to death?

...who might have been saved with a Dry Chemical extinguisher?

Dry Chemical can be used safely on persons afire

Safe-T-meter Dry Chemical is non-toxic, non-injurious, medically pure:

- it will not "freeze-burn" exposed skin areas.
- it will not "acid-burn" or blind the eyes.
- it will not produce deadly toxic gas fumes.

... and some say the chemical properties of Safe-T-meter Dry Chemical's sodium bicarbonate contents actually relieve pain and suffering by coating the burned skin areas with its cooling, healing powder.

In cases of major fires, Dry Chemical's powder cloud can be used as a heat shield to permit rescue work or enable trapped persons to escape through the flames.

If you have the responsibility for protection of human life – in plants, public places, hospitals, schools, sanitariums, *in your home* – consider this unique advantage of Safe-T-meter Dry Chemical as an extinguishing agent.

Safety First

PRODUCTS CORPORATION
ELMSFORD, NEW YORK

MANUFACTURERS OF Safe-T-meter
PRESSURIZED FIRE EQUIPMENT

Circle Item No. 183—Reader Service Card

do you have the right gas detection equipment for the job?

If you have a problem with combustible gases your requirements may vary widely. Check this list below. Complete catalog data is available on all J-W models. Send for it now.

Spot-checking for gas or vapor in confined or inaccessible areas—**J-W Sniffer Model G** portable

A certain phase of your operation needs continuous checking for presence of combustible gases—single detector located in area—**J-W Model E** alarm

Same as the Model E but *entire* instrument located in hazardous area—**J-W Model EE** with explosion proof housing

Continuous checking at one location where extreme temperature or accessibility is a problem—**J-W Model SM** alarm

A continuous watch is needed but in various or changing locations—**J-W Sentinel** portable, audible alarm

From 2 to 8 locations require sequential gas check and relay of information to a main analyzer panel—**J-W Model RV**

J-W Model RV Alarm, with recorder.

Synonymous with safety. Trustworthy performance in J-W instruments is assured by efficiency in design, quality components and skilled and painstaking craftsmanship . . . thirty years experience in developing combustible gas indicators.

J-W **JOHNSON-WILLIAMS, INC.**
PALO ALTO 9, CALIFORNIA

30 years of leadership in explosion prevention

Canadian customers please write: **SAFETY SUPPLY CO.** TORONTO, ONT. **FLECK BROS. LTD.** VANCOUVER, B. C.

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or connected to grounded pipe lines should be grounded. Grounding wire should be uninsulated.

Electrical equipment. For Class I hazardous locations, explosion-proof electrical equipment is specified by the National Electrical Code.

Wiring should be in rigid conduit, with fittings approved for explosive atmospheres.

Transfer pumps of approved design should be used where quantities of flammable liquids are handled. These pumps are self-priming and equipped with flame arresters and protected openings for pressure and vacuum relief.

Combustible gas indicators are available for testing for various gases and vapors including carbon monoxide, hydrogen sulfide, benzol and for oxygen deficiency. An indicator should be used only by an experienced person and the manufacturer's instructions should be followed. * * *

Weed Control

WEEDS, sometimes called "unwanted vegetation," infest plant sites, parking lots, storage yards, railway tracks, roads, ditches, and other industrial and public areas. Their control is an essential part of plant maintenance.

Weeds and grasses take over in many locations where cutting or pulling is an expensive task. When dry they form a serious fire hazard. They also encourage rot and corrosion.

Around wood foundations, posts, lumber piles, and railroad ties they hold the moisture that encourages fungus rot.

Along fences and in yards where metal stocks are stored they accelerate corrosion. Fences, pipe, and fittings need more frequent replacement where uncontrolled vegetation shields these installations from the drying effects of sun and wind.

A rank growth of weeds will hide lurking objects where employees walk, such as along railroad sidings and switches and around parking lots. When wet with dew or rain these spots may become slippery.

Many weeds present a health hazard due to allergies associated with such species as ragweed. Poisonous plants such as poison ivy and poison oak are a serious hazard.

Control of weeds in lawns is now relatively easy with various formulations of 2, 4-D.

Crab grass can be controlled readily with many commercial products without permanent injury to desirable grasses.

Brush killer formulations are widely used for control of woody plants such as poison ivy, willows, or sumac in grassed areas.

Nonselective killers. For some locations, complete elimination of all vegetation is desirable. On such areas, nonselective soil-sterilant types of herbicidal chemicals offer an efficient and economical means of handling the problem.

Sodium chlorate has been widely used and is quite effective in many cases. Because of fire hazards, its storage, handling, and use require numerous precautions.

Some newer weed killers are nonselective, long lasting when applied to soil, nontoxic to persons and animals, non-corrosive to metals used in plant installations. They are low in cost and can be applied by company gardeners or maintenance men without special equipment. They do not introduce a fire hazard.

Static Electricity

SPARKS resulting from static accumulations are a common source of fire. The hazard is particularly serious wherever there may be flammable vapors, gases, or dusts.

Cold, dry weather is most hazardous. A warm, humid atmosphere helps to draw off static charges.

Causes

Static charges result from:

1. Friction between small particles.
2. Contact and separation of two unlike substances, one or both of which are nonconductive.

Gasoline and other flammable liquids flowing through hose, or dust-laden air through noncon-

KILL RECORD VAULT FIRES FAST

. . . with a Kidde Automatic Carbon Dioxide Fire Extinguishing System . . . the fastest, safest 'round-the-clock fire protection you can buy. At the first hot breath of fire, Kidde's rate-of-temperature-rise actuators trigger the system. Instantly, carbon dioxide smothers fire, then vanishes into thin air. Leaves no mess. The Kidde system features all operating parts completely enclosed for safety. No falling weights, no clumsy mechanical triggering methods. Pressurized, no outside power needed. Visual indicators to show if system is set or released. Easy testing of all operating parts. No parts to replace after operation or test. For more information write today for Kidde's Automatic Carbon Dioxide Fire Extinguishing Systems Booklet.

Kidde

Walter Kidde & Company, Inc.
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Walter Kidde & Company of Canada Ltd.
Montreal—Toronto—Vancouver

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ductive passages, may produce static charges.

Belts and shafting. Static charges are generated on dry belts (particularly rubber or leather) by contact and separation of belt and pulley. Accumulations can be controlled by use of conductive rubber belting.

Belts can be grounded with sharp-pointed metal combs or metallic tinsel static collectors which are grounded.

Where highly flammable vapors may be present, chain drive or conductive rubber pulleys, rather than combs, should be used.

Conductive rubber belt dressings, if renewed frequently, are helpful.

Powdered materials. Finely divided materials falling through the air or blown through pipes may generate static electricity and ignite explosive mixtures of dust and air. Machines should be bonded and grounded at several points.

Preventive Measures

Humidity maintained at or above 60 per cent at 70 F. helps to prevent accumulation of static charges. High humidity is obtained by special humidifiers or steam jets installed on blower-type heaters.

Ionization of air also is used. Ionized air contains electrically charged particles which conduct static charges to grounded parts of machines. Ionization methods include gas flames, discharges of high potential electric current, and radiation from radioactive material. These methods require expert installation and maintenance and may involve fire or health hazards.

Conductive shoes. Body static charges may create a hazard in areas which contain highly flammable dusts, gases and vapors. Shoes with conductive soles and heels help drain off charges. Their conductive value is reduced by foot powders and by wool, silk, or nylon socks. Cotton and rayon are safer.

Conductive floors should be installed in hazardous locations. Ordinary wax and other nonconductive floor finishes reduce the value of grounding measures. Special finishes for conductive floors should be used.

Automatic sprinklers should be provided inside bins and processing equipment containing combustible materials. Where water may cause reaction with or damage to material, inert gas extinguishers may be used. * * *

Preventing Welding And Cutting Fires

All operations should be restricted to a specified area and before portable units may be moved, written consent of a qualified official must be secured. The location must be carefully examined before signing permit.

No cutting or welding should be done while sprinklers are out of service.

The risks of injury or fire from spilled industrial liquids are too serious to be neglected. Furthermore, dripping spigots represent waste as well as poor plant housekeeping.

Blackmer *Flo-Master* and Blackmer Rotary hand pumps are your best preventative against these dangers. They feature easy pumping, self-priming and long service life. Underwriters' Laboratories approved models available.

"liquid materials handling"® equipment

BLACKMER

INDUSTRIAL, HAND AND TRUCK PUMPS, STRAINERS, PRESSURE CONTROL VALVES

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Equipment must not be used in presence of flammable vapors and liquids or tanks which have contained such materials.

Floors and surroundings must be swept clean and wet down. All combustibles should be relocated 30-40 ft. away. Remainder should be covered with asbestos curtains, metal guards or flameproofed covers (not ordinary tarpaulins).

Extra men should be provided to watch sparks. Ample fire protection equipment, such as hand hose, extinguishers or water pails, should be provided.

When operations are in combustible buildings, men should be stationed on the floor below and possibly on the floor above. The areas including the floors above and below the one on which the operation is performed should be patrolled for at least half an hour after the work is completed.

If near the shutdown period, remaining employees or watchman also should be notified.

Cutting and welding equipment should be kept in good repair at all times; soapy water should be used in testing for leaks.

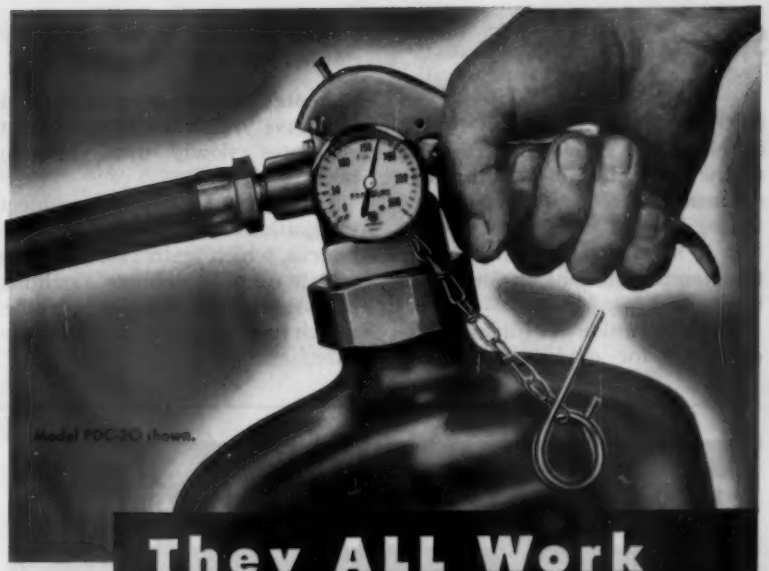
Fire Protection for Industrial Trucks

Industrial trucks—ram, fork or crane—can be powered by gasoline engines, liquefied-petroleum gas, gasoline-electric power units, or storage batteries. These power plants present a definite fire hazard.

Each industrial truck should be equipped with a 2½-lb. carbon-dioxide extinguisher; a 4-lb. gas-pressured dry-chemical extinguisher, or a 1-qt. vaporizing-liquid extinguisher. These are the smallest sizes approved for industrial use.

Gasoline trucks should be refueled in a safe location away from storage and manufacturing areas—preferably outdoors. The engine should be shut off during refueling and care exercised to avoid spilling fuel or overflowing the tank.

Collisions also cause damage. Lift trucks have been known to break sprinkler pipes, causing heavy damage to stock.



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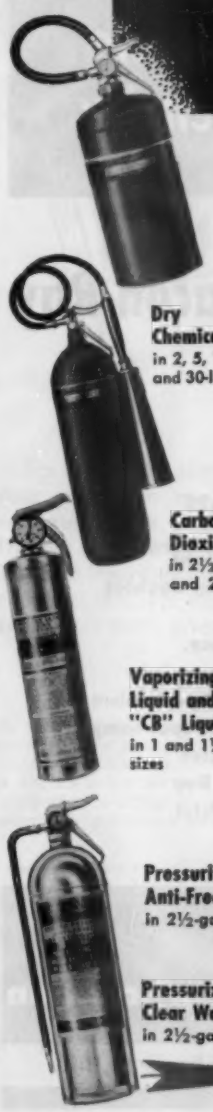

Dry Chemical in 2, 5, 10, 20 and 30-lb. sizes

Carbon Dioxide in 2½, 5, 10, 15 and 20-lb. sizes

Vaporizing Liquid and "CB" Liquid in 1 and 1½-qt. sizes

Pressurized Anti-Freeze in 2½-gal. size

Pressurized Clear Water in 2½-gal. size

With *only one* method of extinguisher operation to bear in mind, *any* of your personnel—in *any* location—can pick up an American LaFrance squeeze-grip extinguisher and put it to work instantly!

Simple as A-B-C!

To operate, just: 1—Pull a pin; 2—Squeeze grip-levers together; and 3—Direct discharge at base of flame!

A single explanation is all that is needed to make every employee a "Minute Man" . . . equipped to cope with a fire emergency in the *first moments* before fire spreads beyond control!

Keep Fire Losses Down!

With the squeeze-grip extinguishers shown at left, you can provide protection against *all classes* of fire. The proper selection in each location will help keep fire losses to the absolute minimum! Write us for more information on the types which fit your needs.

AMERICAN LaFRANCE

Elmira, New York, U.S.A.
In Canada, LaFrance Fire Engine & Foamite Ltd, Toronto

THE WORLD'S FINEST AND MOST COMPLETE LINE OF FIRE PROTECTION EQUIPMENT

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Spontaneous Ignition

SPONTANEOUS IGNITION is a chemical action in which there is a slow generation of heat through oxidation of combustible material. Under certain conditions, oxidation is accelerated until the ignition temperature of the material is reached.

This condition requires sufficient air for oxidation but not enough ventilation to carry away the heat as it is generated.

Acute cases occur suddenly and explosively; in **chronic** cases heat generates slowly until ignition takes place.

Examples of substances subject to ignition are dry yellow phosphorus, which ignites on exposure to air, and quicklime, sodium, potassium, and calcium carbide, which heat when exposed to moisture.

Some materials may be stored for long periods, processed, packed and shipped with no signs of heating. The first warning may be the discovery of smoke. Uncertainty increases the hazard.

For spontaneous ignition there must be combustible material, moisture, oxygen, and a certain minimum temperature. Impurities in combustible material may affect heating.

At ordinary temperatures some combustible substances oxidize slowly and under certain conditions reach their ignition point. These include vegetable and animal oils and fats, coal, charcoal, and some finely divided metals.

Rags and waste saturated with linseed oil or paint often cause fires. They should be deposited in waste cans with covers (preferably self-closing and removed daily).

Best preventives are either total exclusion of air or good ventilation. With small quantities of material, the former is practicable. With large quantities, such as storage piles of bituminous coal, both methods have been used.

Temperatures above 140 F. are considered dangerous in coal piles. If temperatures rapidly approach or exceed that figure, remove the pile or rearrange it to provide better circulation of air.

Agricultural products susceptible to spontaneous ignition include sawdust, hay, grain, jute, hemp, and sisal, especially if exposed to heat or to alternate wetting and drying. Circulation of air, removal of external sources of heat, and storage in smaller quantities are desirable precautions.

Fires in iron, nickel, aluminum, magnesium and other finely divided metals are sometimes attributed to spontaneous ignition. This is believed to result from oxidation of cutting or lubricating oils, or possibly from chemical impurities.

Materials like unslaked lime and sodium chlorate promote sponta-

Detailed procedure for prevention and extinguishment of fires in material subject to spontaneous heating is found in National Board of Fire Underwriters publications, *Preventing and Extinguishing Fires in Soft Coal*, Bulletin No. 30, and *Spontaneous Ignition and its Prevention*, Bulletin No. 51.

Better Visual Warning

Double Range

Double Intensity

with the *new* 271 Beacon Ray

The adaptability and success of the model 275 Beacon Ray created demand for an even more powerful and more rugged warning light. The new FEDERAL 271 Beacon Ray more than doubles the intensity and range of the original. It can mount on a 1" pipe or on a flat surface, it has a substantial cast aluminum housing and a heat resistant glass dome which houses a mechanism that rotates a single, powerful sealed-beam spot lamp. The hinged cover with single clasp, facilitates relamping and inspection. The 271 Beacon Ray is built for real service and full dependability!

FEDERAL SIGN and SIGNAL Corporation

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neous ignition, particularly when wet. Such materials should be stored in a cool dry place away from combustible material.

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2 Million Dollar Coffee Break

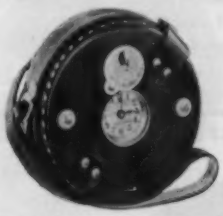
This Texas watchman took an unauthorized coffee break. Hearing a noise—he discovered the freight section in flames. Firemen were too late to prevent a $1,950,000 loss.

For complete plant protection your watchman *must* be rigidly supervised with a tape-recording DETEX Guardsman Watchclock. Through lonely nights, long weekends and holidays the Guardsman keeps him alert, gives you a tamper-proof, minute by minute record of his activities.

The Guardsman saves money on supervisory overtime, often reduces fire and burglary insurance premiums. Send the coupon today.

FREE INSPECTION

Is your watchman's tour giving you maximum protection? Are your clocks adequate, register keys in good order, and station-box screws properly sealed? A DETEX *Inspector will be glad to make a free, no-obligation analysis to insure that your plant has maximum protection. Write or telephone today.*



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☐ Please send me complete information about the GUARDSMAN tape-recording watchclock.
☐ You may send a DETEX inspector to make a free, no-obligation survey of our plant protection needs.

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Find Your Nearest DETEX Inspector In The Yellow Pages

N-3

Construction That Resists Fire

Fire-resistant construction is essential for any industrial or commercial building. Some types of construction can survive a fire with only minor structural damage.

Building materials should be noncombustible wherever practicable, although any material may be damaged by extreme heat.

Walls and openings should be planned to prevent rapid spread of fire. Large areas should be subdivided by fire walls, with openings protected by fire doors.

For nonhazardous occupancies heavy plank roofs and floors are permissible. Heavy timbers are slow burning.

Wooden walls, joisted quick-burning floors and roofs, and inaccessible combustible spaces should be avoided.

Limiting Fire Areas

Hazardous processes should be cut off by fire walls or fire-resistant partitions. Severe hazards should be housed in separate buildings.

Explosion hazards require explosion-venting windows or other means of relieving pressures to minimize structural damage.

Important buildings with combustible roofs and floors should be separated by as much yard space as possible.

For buildings of more than one story, stairways, elevator wells, conveyors, and chutes should be enclosed with fire-resistive walls. Fire doors at openings check spread of fire to other floors.

Blank walls, fire shutters, or wired-glass windows offer protection against exposure fires. Open sprinklers are an additional safeguard.

Fire doors should either close automatically each time they are opened or be closed by a heat-actuated device if fire should break out. The most common device is the fusible link.

The releasing device should be located where it will be affected quickly by heat passing through the doorway and should be protected against mechanical injury.

Where flash fires may occur, quick-operating devices are preferable, except for doors used as exits.

Types of doors for various exposures have been approved by testing laboratories.

Fire shutters are used for windows where there is an exposure hazard from adjacent buildings. Shutters may be swing type (tin clad or steel) or rolling steel. The latter can be installed where space is too limited for swinging shutters.

Sliding shutters are not recommended where snow and ice might interfere with their operation.

Reserve Water Supply For Fire Fighting

Public water systems are often taken for granted. While their general record is excellent, they are subject to accidents which may suddenly put a plant entirely on its own resources.

OILY WASTE CANS

for old rags or combustionable material. Underwriters approved. From 6 to 25 gallons.

SAFETY CANS

for easy handling of flammable liquids. Underwriters labeled. In 1 pint to 5 gallon sizes.

DISPENSING PLUNGER CANS

for sponging and cleaning with flammable liquids. In 1 quart, ½ gallon and 1 gallon sizes. Approved by Factory Mutuals.

SAFETY EXTENSION LIGHT

(#1729-8) — for safe inspection of storage or operating equipment . . . 15" or 30" extensions for lighting inaccessible areas. Underwriters approved.

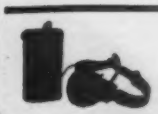
SAFETY FLASHLIGHT

(#1717-8)—for use in group D, class 1 hazardous locations. Fully insulated. Underwriters Lab. approved.

SAFETY LANTERN

(#1744-8) 6 volt—for use in hazardous locations. Wire guard and stand. Safety kick-out bulb sockets. U.L. approved.

SAFETY HEADLIGHT



(#1704-8)—with belt clip for case and padded headband for light. Fully flexible with 1,500 ft. beam. Leaves both hands free.

FOR EXTRA PROTECTION

JUSTRITE SAFETY CONTAINERS AND LIGHTS

SAFER! BECAUSE THEY'RE STRONGER

JUSTRITE Safety Cans—a maximum (15 lb.) lead coating on copper bearing steel prolongs the life of the Justrite Safety Can. "Double lock-seam" construction assures an unstretched coating of uniform thickness inside and out. Reinforcing ribs strengthen body of can. Cast malleable spout with self-adjusting cover will take hard use and keep contents safe. A cast Spout Lip aids pouring, helps discharge "static."

JUSTRITE SAFETY LIGHTS—heavy gauge, rust-proofed metal construction of lanterns and headlights. Seamless, cement-free construction of plastic flashlight cases. Exceed the requirements of Class 1, Group D.

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Save money, save time. Get the full story in new Justrite 16-page full color catalog!

JUSTRITE MANUFACTURING CO.

2061 N. SOUTHPORT AVE., CHICAGO 14, ILL.

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Damage from floods, failure of obsolete equipment, freeze-ups and power failures have all occurred to hamper supply of water.

In one case, a 30-in. supply main, sole link from a reservoir to an industrial city, broke, leaving plants without fire protection. Long single mains are particularly vulnerable.

Drought-caused water shortages are a recurring problem in many communities.

Growth of population and increased industrial activity are straining supplies in some communities. While, in most cases, these conditions are remedied quickly, they present a problem which may be accelerated.

Water supplies to supplement a public water supply at a plant are furnished by gravity tanks, by fire pumps taking suction from open bodies of water or from tanks, and occasionally, by private gravity reservoirs.

These supplies must be checked often. Such a check should include levels in tanks and reservoirs, pressures in mains and sprinkler systems, and condition of fire pumps.

Cold-Weather Precautions

Extinguishers. In unheated locations, provide nonfreezing extinguishers, or heated cabinets for extinguishers which could freeze. Fill fire pails with nonfreezing solutions.

Fire pumps. Keep pump houses adequately heated.

Protect suction pipe and intake from freezing.

Hydrants. See that hydrants are tight and drain properly.

Keep hydrants and indicator posts unobstructed by snow.

Wet-sprinkler systems. Provide adequate heat in all sections, especially over week ends.

Repair windows and doors which are not weather-tight.

Dry-sprinkler systems. Make sure dry-pipe valve enclosures are well heated.

Check air pressures daily.

Check dry-pipe alarms.

Blow out drains and low points frequently.

Check pitch of all piping for pockets where moisture could collect and freeze.

Sprinkler tanks. Provide heating systems for tanks and be sure they are in good operating condition. Flush out circulating pipes and heater.

Do not overflow tanks to prevent freezing.

Metal Fires Need Special Extinguishers

Ordinary extinguishers are not effective for magnesium, powdered aluminum, zinc, sodium, or potassium fires. For such fires an extinguishing powder, G-1, has been developed. This is available in 40-lb. pails and 325-lb. drums. It is usually applied in a layer at least 1½ in. deep.

Where large amounts are needed, a wheeled applicator hold-

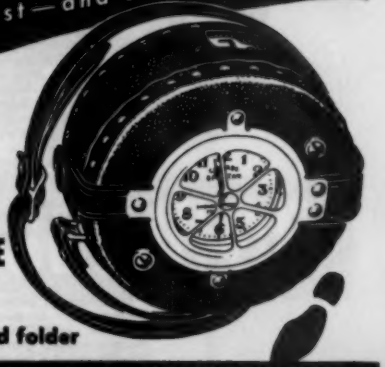
In the silence of the night

the watchman makes *his* rounds while the hands on his CHICAGO Watchclock make *their* rounds.

In the morning, there is a permanent dial-record of exactly where the watchman was during each hour...in the silence of the night.

The tamperproof CHICAGO Watchclock system is approved by both THE UNDERWRITERS' LABORATORIES and by THE FACTORY MUTUAL'S LABORATORIES. It gives extra protection against fire, theft and sabotage.

CHICAGO WATCHCLOCK
The first—and still the first



Quickly pays for itself... REDUCES INSURANCE RATES

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OFFICES IN PRINCIPAL CITIES

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Falcon®

"Sounds for Safety"

AUTOMATIC HIGH-LEVEL alarm prevents costly, dangerous overfilling of petroleum, chemical, water, other liquids in fixed- and floating top, indoor and outdoor, mixing, storage tanks. Safe, reliable gas-powered horn audible for one-half mile and more.

MANUALLY-OPERATED, gas-powered signaling horns ideal for emergency and 1,001 other uses. Self-contained units are highly portable, entirely reliable. Non-electric operation permits use in hazardous vapor areas. Small units feature disposable Freon cans.

NEW AUTOMATIC fire detecting systems and units give early warning in case of fire. Heat activates any single Freon-powered detector in system, instantly sounds horn. Ideal for homes, institutions, commercial, industrial buildings. U/L approved, low cost.

DEALER TERRITORIES OPEN

Falcon Alarm Co., Inc.

243 Broad St., Summit, New Jersey

CIGARS-CIGARETTES-MATCHES

immediately extinguished

...with

SIPCO DUNKING STATIONS

Fire Hazards from Smoking are a problem EVERYWHERE.

STOP FIRES BEFORE THEY START—with SIPCO DUNKING STATIONS.

Heavy duty CAST ALUMINUM canisters—guaranteed 3 years against breakage. Partly filled with water, they drown the "smoke". NO FIRE HAZARDS — NO ODORS — NO UNSANITARY CONDITION.

Lift off the canister, flip back the lid, dump it and the cleaning job is done.

SMOKERS GOOD HOUSEKEEPING PREVENTS FIRES PUT 'EM HERE

Available in over a dozen different STANDARD and JUMBO SIZE models. Choice of black crinkle or bright polished DELUXE finishes to suit your particular requirements. NEAT, ATTRACTIVE — USED EVERYWHERE — OFFICES, CLUBS, LOUNGES, HOSPITALS, HOTELS, SHOPS, RESTAURANTS, INSTITUTIONS, SCHOOLS, ETC.

NEW MODEL 4J

Designed for permanent mounting on walls, posts, columns, etc. in public areas. Eliminates pilfering problem. JUMBO size canister furnished with light weight, rugged glass-fiber inner-liner. Flip back the lid—lift out the inner-liner and dump it. Inner-liner fits all JUMBO size SIPCO canisters and is available separately.

MODEL 1JD

JUMBO size DELUXE FLOOR MODEL. Heavy weighted base and attractive, eye catching sign. Height 42"—weight 26 lbs. Ideal for halls, aisles, landings, etc. Also available less sign (MODEL 1JWS).

WRITE FOR ILLUSTRATED BROCHURE.

STANDARD INDUSTRIAL PRODUCTS CO.

DEPT. S • 920 N. GARFIELD AVE. • PEORIA, ILLINOIS

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ing 600 lbs. of powder can be used. The powder is discharged by an electric impeller through a hose and nozzle.

How Does Your Fire Protection Rate?

Fire Doors. Are self-closing devices in good working order?

Do fire doors close easily and automatically?

Are doors kept clear of stored material and other obstructions?

Are doors and metal coverings in good condition?

Electrical Equipment. Are fuses of correct size applied to all circuits?

Has all temporary wiring been eliminated?

Are light bulbs kept clear of combustible materials?

Are oil switches and circuit breakers in good working condition?

Has dielectric in transformers and switches been checked?

Are electrical grounds and lightning protection satisfactory?

Fire Appliances. Is every fire extinguisher properly charged and tagged?

Can extinguishers be reached quickly?

Has defective or missing equipment been replaced?

Do outside hydrants drain so as to prevent freezing in winter?

Will all fire hose stand necessary pressures?

If you have a truck, is it ready for immediate use?

Clean Up. Is all dipping equipment cleaned regularly?

Are trash and flammable materials quickly and safely disposed of?

Are metal trash receptacles used?

Is excelsior and similar material kept in fire-resistant containers?

Auxiliary Firemen. Are auxiliary firemen well trained? Do they drill often?

Does your fire department maintain regular fire inspections?

Is responsibility for fire protection properly delegated?

Are firemen equipped with all necessary supplies?

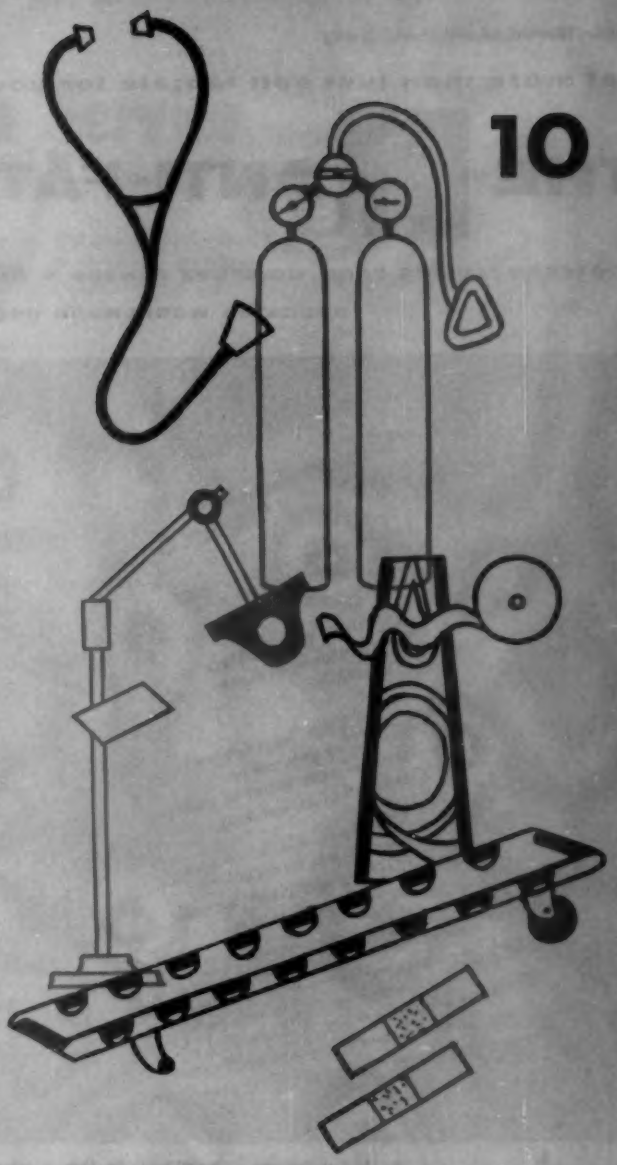
Do firemen keep up with the best fire-fighting methods?

Is the public fire department familiar with your plant?

IN SECTION 10:

Medical and Health Service . 247
Care of the Injured 249
Resuscitation 253
Snake Bite 254
Poison Ivy 255

10

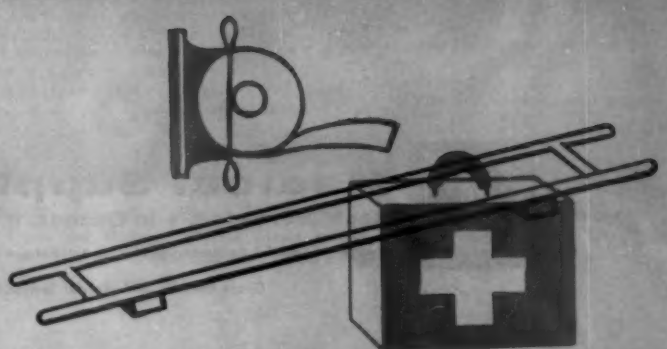


INDUSTRIAL MEDICINE is an important factor in the public health picture. It provides "preventive maintenance" for the people who carry on essential work in the present day economy. And many of the products needed in our daily lives involve health hazards in manufacture.

Medical departments have achieved a high degree of control over these hazards through examination, placement, and health supervision over the individual worker and through supervision of manufacturing processes.

Doctor and nurse also serve industry and the public by keeping minor injuries from developing into serious ones and through health education.

MEDICAL and HEALTH SERVICE



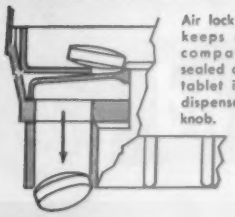
get more than just salt tablets for your money

THE MSco ANTI-FATIGUE STATION

PROTECTS TABLETS FROM MOISTURE DAMAGE • DISPENSES MODERN IMPREGNATED TABLETS

EDUCATES WORKERS IN USE OF SALT TABLETS

MSco
Controlled-action* SALT TABLETS
DO take these tablets to help your body fight "heat fatigue"
DON'T let "heat fatigue" rob you of pep, invite prostration, or increase your chances of an accident
DON'T worry about stomach upset when you take these tablets, they have "controlled-action"... just follow the simple directions below...
INSTRUCTIONS:
MEDICAL SUPPLY COMPANY, ROCKFORD, ILLINOIS
Controlled-action*
MSco
SALT TABLETS
NO. 350 - 500 TABLETS
Packaged by
Medical Supply Company



Air lock feature keeps storage compartment sealed off while tablet is being dispensed from knob.

NEW AIR-LOCK disposable dispenser

Now available for the first time . . . this durable all-plastic dispenser (patent pending) which locks out moist air and fumes continuously, even while dispensing a tablet. Greatly reduces waste and nuisance of moisture deterioration. Can be mounted on vehicles. Two sizes: No. 350 contains 500 tablets, No. 300 contains 1000 tablets.

NEW worker education placard

Attractive permanent placard in pleasant colors for display alongside your Air-Lock dispenser. Exactly the straight, simple aid you need to continually remind your workers of *why* and *how* they should take salt tablets. Cuts through confusion and superstition to help keep efficiency up, accidents down when heat fatigue threatens your operation.

CONTROLLED ACTION impregnated salt tablets

Individually incased crystals start to release energy-preserving salt in less than a minute. Supply salt at a steadily controlled rate as the body needs it, well below stomach's tolerance, over a period of about three hours. Two tablets every 1½ to 2 hours help prevent serious heat fatigue.

SEE FOR YOURSELF—

Use the indicated space below to request test-tube demonstration of the *controlled* action of MSco impregnated salt tablets.

Specialists in first aid

MSco **Medical Supply Company**

Rockford, Illinois • In Canada, It's Safety Supply Company

To see full demonstration of MSco Anti-Fatigue Station, write name, company, and address below and mail.

Circle Item No. 194—Reader Service Card

Medical and Health Service

HEALTH MAINTENANCE for employees, through the prevention as well as the treatment of both disease and accidents, is the goal of industrial medicine. The medical department plays a major part in accomplishing this through:

1. Supervision of processes and the working environment to provide safe and healthful working conditions.
2. Services for the treatment of the ill or injured.
3. Supervision of the health status of the individual through examination, counseling, and placement.
4. Health education.

New processes and materials with actual or potential health hazards have brought additional problems to the medical department. To study and control hazards and devise protective measures for those who manufacture the products and those who use them, some large corporations maintain industrial hygiene laboratories. Others sponsor research projects through universities and foundations.

Smaller companies obtain help in solving their medical and health problems from insurance companies, state departments, laboratories maintained by universities and research organizations, and from consulting industrial hygienists.

Scope of Medical Program

Industrial medical service requires an organized plan. It must have management's full support but the program should be set up and operated by a physician who should be given considerable latitude in carrying out his methods and policies.

Essentials of the program are:

1. A staff of qualified physicians, nurses and attendants.
2. Dispensary and hospital facilities conforming to standards established by the American Medical Association, American College of Surgeons, and the American Association of Industrial Physicians and Surgeons.
3. Efficient care of occupational injuries and diseases.
4. Reasonable first-aid treatment for nonoccupational injuries and illnesses while on the job.
5. Physical examinations—preemployment and periodic.
6. Adequate records of treatments and individual medical histories. (The latter should be kept confidential.)
7. Supervision of plant sanitation and hygiene measures.
8. Instruction of employees in personal health and safety.

Industrial medicine recognizes the place of the private practitioner in providing medical care for the employee and his family and does not enter into competition where community medical resources are adequate.

Hospitals. Use of approved public hospitals, where available, is usually more desirable than setting up elaborate facilities for surgery and treatment of serious cases.

The Staff

The medical director. Health and medical services should be under the supervision of a physician. Management and the medical director can formulate workable policies.

Medical assistants, consultants, nurses, and others should be selected on the recommendations of the medical director.

A full-time physician may be warranted by size of the plant or nature of its operations. Sometimes a plant physician engages in private practice with the company's approval. He may devote part of his time to the industrial organization, assuming supervisory responsibility and delegating detail work to qualified assistants.

The Nurse. Most industrial nurses are employed by companies which have single-nurse dispensaries and a part-time or on-call physician. She is assistant to the physician and his representative when he is not at the plant. She is also friend and confidant of the employees.

Where the nurse is the only full-time person in the dispensary, her duties include:

COMPACT and well-equipped dispensary. Acoustical tile is used for ceiling and asphalt tile for floor. Plywood walls in natural finish get away from hospital austerity and are kept clean by waxing. (The Austin Co.)

1. Maintaining supplies and equipment.
2. Providing first-aid care for injuries and emergency treatment of illnesses as authorized by the physician in charge.
3. Assisting the physician with medical examinations.
4. Participating in the health and safety program.
5. Promoting health education and counseling employees on personal-health problems.
6. Taking part in welfare activities.
7. Keeping adequate dispensary records. Paper work should not be permitted to interfere with professional duties.
8. Being familiar with the plant and its hazards through plant tours.

The health program may require the services of other specialists, such as industrial hygienists, safety engineers, and sanitary engineers.

Cooperative services. Where several small plants are close together a cooperative medical service program can often be carried on. A central dispensary with necessary personnel and equipment is maintained. Adequate service can be provided at moderate cost.

Physical Examinations

Pre-placement examinations are standard procedure in many companies. Their purpose is to place each employee in a job suited to his capacity rather than to bar anyone from a job.

Periodic checkups are desirable, particularly for elderly employees, for those in jobs where safety depends on physical fitness, and where there is exposure to health-hazardous materials.

Examinations include vision, heart, chest, blood pressure, hearing, and urinalysis. Tests in some industries require elaborate laboratory facilities and highly trained personnel.

Laboratories. For most industries, facilities for taking urine tests and blood counts are needed. Blood serum samples can be sent to a laboratory for analysis. Where a large volume of toxicological tests is conducted, a plant laboratory may be desirable.

Vision. Several devices for testing visual acuity and classifying workers for jobs are available. These devices can be used by trained laymen. Employees showing visual defects are referred to ophthalmologists or optometrists for further tests.

Hearing. By means of the audiometer, acuteness of hearing can be determined and any necessary treatment indicated. Progressive loss of hearing, through noisy work or other causes, can be measured.

Chest. For many occupations, pre-employment and periodic examinations include chest x-rays. Mass chest surveys are made at regular intervals in industries where health hazards require frequent checks, and in public health campaigns to detect incipient cases of tuberculosis and cancer.

Trained technicians with mobile equipment can be engaged to conduct mass x-ray surveys.

Consultants

The medical director, like the private practitioner, is not an expert in all branches of medical science. Both find it necessary at times to call on specialists when diagnosis is uncertain or treatment requires specialized techniques.

Surgeons. In all surgical cases where there is danger of inaccurate diagnosis or inadequate treatment, an outside consultant should be called in early. Frequently, the administrative and diagnostic ability of the medical director is more important than his skill in surgery. The plant physician should refer all cases which might be beyond his training and experience to a specialist or surgeon.

Oculist. One of the most frequent occupational injuries is to the eyes. The importance of one's eyesight justifies obtaining the highest available skill. Specialists should be summoned in all potentially serious cases.

Ophthalmologists and optometrists also can serve industry in correcting defective vision among employees. The employee should, of course, have the privilege of choosing his own refractionist, but frequently he will ask advice of the medical department on selection of a specialist.

Where prescription goggles are indicated, some companies provide the examination.

UNIT dressings in first-aid kits are carried on trucks for emergencies on jobs far from dispensary. (Panhandle Eastern Pipe Line Co.)

Dentists. Injuries to the teeth are relatively infrequent in industry. Such cases usually are sent outside for treatment. The medical department should have a list of dentists qualified to treat such injuries.

The importance of oral hygiene has led many companies to provide dental examinations, sometimes including full-mouth x-rays and oral prophylaxis. Findings are usually referred to the employee's dentist.

Mobile Clinics

A recent development in industrial health service is the mobile clinic which makes it possible to extend medical coverage to more employees.

The simplest type, which consists of a trailer towed behind a car or station wagon, is equipped to give some of the simpler tests. More elaborate is a bus-type vehicle housing facilities for visual, hearing, and x-ray examinations. It is practically a self-sufficient medical department and laboratory on wheels. * * *

Care of the Injured

ACCIDENTS and sudden illness may be expected wherever people work, travel or engage in recreation. First-aid facilities that meet at least minimum standards should be available. Equally necessary is the trained person who knows what to do and what *not* to do in an emergency.

Prompt, skilled treatment has prevented many minor injuries from becoming serious. Sudden attacks of illness may occur anywhere, and the layman who can administer emergency treatment and get the patient to a physician can often prevent serious consequences.

A physician or nurse should treat injuries wherever possible. Companies which have trained large numbers of first aiders do not permit them to treat injured persons *if medical service is available.* Their training is strictly for emergencies.

Most injury cases, however, both on the job and outside, are first handled by laymen. The minutes before the doctor arrives may be vital. Many a life has been saved because some person checked bleeding, treated shock, or applied artificial respiration.

Many laymen acquired skill in first aid during military service and demonstrated the value of their training in combat. Many civilians have been trained by the American Red Cross and the Bureau of Mines in the United States, the St. John's Ambulance Association in the British Commonwealth, and by similar organizations in other countries.

Adequate care of the injured requires:

1. Trained attendants.
2. Clean, convenient quarters.
3. Equipment and supplies that meet medical standards.
4. Well-planned organization and procedure.
5. Well-kept records.

This discussion is concerned primarily with plants which must depend on trained laymen, or at most a full-time nurse and part-time physician rather than those with medical staffs and hospital facilities.

The Staff. First-aid facilities should be under supervision of at least a part-time physician. A full-time registered nurse is desirable, even in a medium-sized plant.

If a full-time nurse is not practicable, at least two employees who have completed standard first-aid courses should be selected to carry on the work. They should be under supervision of a doctor or nurse.

Attendants should be allowed sufficient time from their jobs to maintain the first-aid room, check supplies and keep necessary records. An attendant should be available during working hours.

MOBILE FIRST AID unit with resuscitator and other emergency equipment can be moved quickly to the scene of an accident.

The Dispensary

A separate room should be provided, if possible. Patients should have reasonable privacy. If it is not practicable to partition the dispensary into a waiting room and a treatment room, a screen can be used.

The first-aid room should have:

1. Good lighting.
2. Adequate ventilation and comfortable temperature.
3. Lavatory with hot and cold running water.
4. Quiet location.
5. Floors of durable and easily cleaned material.
6. Toilet facilities.

The first-aid room should be quiet, well ventilated and away from doors. Windows should be screened to keep out insects.

Furnishings should be simple and neat. The color scheme has an important influence on the patient. Walls painted with semi-gloss enamel in light tints of green, cream or buff are cheerful

and easy to keep clean. Dead white is no longer favored.

A patient who is nervous or in a state of shock may be upset still more by intricate patterns on walls and ceilings.

The floor should be resilient and easy to clean. Linoleum, rubber tile, vinyl tile, and asphalt tile are practical for dispensary use. A sweeping compound, a vacuum cleaner with brush attachments, and damp or chemically treated cloths for dusting help to keep down dust.

Equipment. For a dispensary with a registered nurse in charge under the supervision of a part-time physician, equipment might include:

1. Two white enameled chairs and a bench.
2. Enameled top table or desk.
3. Stool.
4. One or more beds or cots.
5. Linen and blankets.
6. Waste can with cover.
7. File for medical records.
8. Floor lamp.
9. Treatment table and instrument cabinet.
10. Medicine chest.
11. Small sterilizer.
12. Small items of office and surgical equipment, such as basins, pitchers, rubber gloves (sterile), scissors, tweezers, forceps, hot-water bottle or electric heating pad, ice bag.
13. Stretcher.
14. Telephone.

References—Care of Injured

National Safety Council: Unit First-Aid Kits, Data Sheet D-202.
—Emergency Nursing Care of the Eyes; Safety Reprint Gen. 4.
—Pole-Top Resuscitation; Data Sheet D-376.

National Safety News: New Thoughts on Resuscitation; F. A. Van Atta, Dec. 1951.
—Treatment of Low-Voltage Injuries; Henry S. Brown, M. D., June 1953.
—Basic Requirements for First Aid; Jan. 1955.
—First Aid for Field and Small Plant; R. P. Whitney, May 1955.
—Turning Back Death; W. A. Mathews, June 1955.
—Patching Up Some Industrial By-Products; W. B. McCunniff, M. D., Feb. 1956.
—Is Your Plant Immune to Asphyxia? John B. Dunne, Nov. 1957.
—Respiratory Emergencies; Esther Myers Stephenson, Jan. 1958.

First-Aid Kits

If the first-aid room is staffed by nonmedical personnel, keep the setup as simple as possible.

The supervising physician should be consulted about selection of materials, particularly when medication is involved. He should select such items as first-aid antiseptics and burn dressings.

Unit first-aid material is replacing bulk supplies for smaller plants, for small groups detached from a central headquarters, men working in isolated areas where medical help is not available, and on trains, buses, trucks, and airplanes.

Unit first-aid material is desirable for such groups because each dressing and treatment is an individual unit, for one-time use only. Materials can be kept in sanitary condition for long periods. There is more likely to be a sufficient quantity and wider assortment of bandages.

To simplify maintenance of industrial first-aid kits and to establish commercial standards for sizes of unit cartons and kits, the Division of Simplified Practice, National Bureau of Standards, has compiled Code R178-41 in cooperation with industry.

Kit sizes and their contents are determined by the number of persons to be protected, with consideration to the nature and frequency of injuries likely to occur. Kits come in 10- 16- 24- and 36-unit sizes. A 24-unit kit, for example, would be suitable for a group of 50 men.

Specifications outlined in Federal Specifications GGK-391 (Amended) are generally accepted and used by manufacturers in the production of unit first-aid material and kits.

For operations under federal regulation, assortments have been specified although these may not fit all local requirements. Contents of kits include:

Adhesive bandages
Burn compound
Burn solution
Petroleum gauze
Ammonia inhalants
Antiseptic swabs
Antiseptic applicators
Tincture green soap
Eye packets
Bandage compresses—2-, 3- and 4-in.
Tourniquet
Forceps
Scissors
Triangular bandages
Gauze bandages
Gauze pads
Gauze compress
Adhesive tape
Aspirin or other analgesic
Sodium bicarbonate tablets
Poison ivy ointment
Insect repellent

If poisonous snakes are likely to be encountered, a snake-bite kit should be included.

The unit system does away with many of the objections to first-aid kits but a competent and conscientious employee should be responsible for dispensing supplies. Employees may help themselves, often for home use, and supplies may not be replaced. Also, self-treatment should be discouraged.

For the smaller plant, ideal quarters for a first-aid station may not be available but the best possible spot should be chosen. It should be readily accessible to the working zone and convenient for supervision and maintenance.

Hot and cold running water and toilet facilities are as desirable for the small plant as for the larger establishment. Privacy is also desirable and a screen will do if a separate room is not available.

Equipment may be selected from lists suggested for dispensaries, keeping in mind limitations of space and requirements of the plant. The following are essential:

1. Desk or table for filling out reports and records.
2. Chair or stool.
3. Filing cabinet for records.
4. Waste can with cover.
5. Bulletin board.
6. First-aid manual.

Dispensary Records

Accurate records should be kept of treatments. If injuries are infrequent, a small day book may be sufficient, if kept systematically. Entries should include these details:

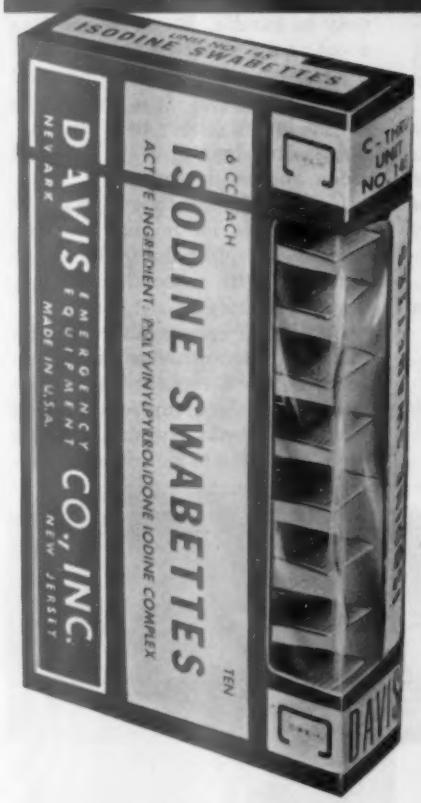
1. Date and time of injury.
2. Date and time injury was reported for treatment.

—*To page 252*

Exclusive **NEW**

SAFETY DAVIS DIVISION

C-THRU UNIT SYSTEM OF FIRST AID



The first important advance in industrial first aid since we originated the D-Unit System!

Each unit has outer cellophane wrapping with easy-to-open pull tab . . . and now, in addition, a "C-Thru" plastic window that shows contents at a glance!

As before, the continuous red line signals when a package has been opened.

All standard Davis First Aid Kits now available with "C-Thru" units.

QUICK INSPECTION WINDOW

This exclusive new Davis feature lets you see and check contents of your first aid kit without removing units. The scored cover of the unit folds back to permit quick and easy access to contents.

ALSO! "C-THRU" Plastic Swabettes and Unettes

"C-THRU" ANTISEPTIC SWABETTES: Complete with cotton swab tip. Easy to apply — patented rupture seal. Flows easily with slight squeeze. Available with Iodine, Isodine, Merthiolate, Zephiran Chloride and other popular antiseptics.

"C-THRU" BURN OINTMENT UNETTES: "One shot" plastic tubes, with patented rupture seal. Economical–10 individual tubes in place of the usual six. Available with Boric Acid, Petrolatum, Tannoid and other popular burn ointments.

"C-THRU" WOUND CLEANSER (Synol® Soap): Individual treatment tubes, with contents always visible. Easy flowing, easy to apply.

Write For Bulletin No. 333

SAFETY DAVIS DIVISION

DAVIS EQUIPMENT CO. INC.

55 Halleck Street, Newark, New Jersey

Circle Item No. 195—Reader Service Card

3. Name of injured.
4. Address of injured.
5. Where and how injury was received.
6. Names, addresses, and telephone numbers of witnesses.
7. Nature of injury.
8. Kind of treatment given, and by whom.
9. Did employee return to work after treatment; if not, when?

First-Aid Antiseptics

Infection of an open wound can be prevented by killing germs already present or by removing them mechanically and preventing entrance of more. It is in this second theory that soap and sterile water are used in aseptic treatment of wounds.

Thorough washing with soap will mechanically remove organisms and a sterile bandage will prevent entrance of more. Few are destroyed in the process by ordinary soaps.

Germicides, including phenol and mercury compounds, have been used in soaps but their effectiveness requires too high a concentration for ordinary use. But good results have been reported from hexachlorophene for general as well as surgical use.

Many substances will kill germs in a test tube but a first-aid antiseptic must kill them in the presence of body substances and not kill too many body cells at the same time. Choosing the proper one should be left to the doctor in charge.

Mercury bichloride, for instance, is effective but injurious to tissues. Compounds such as merthiolate, merphenyl, and mercurochrome are devised to get the antiseptic properties of mercury without its toxic effects.

The halogens (tincture of iodine and Dakin's solution) have been widely used because of their strong oxidizing action. They are even stronger than hydrogen peroxide, which is used for the same reason.

The various antibiotics (sulfa compounds, penicillin, terramycin, etc.) are not antiseptics, though they are useful in treating infections. They should be used only under medical supervision.

Transporting the Injured

Where there is any doubt about moving the patient, medical aid should be brought to the scene of the accident, if possible. Lifting a patient into a car may aggravate injuries.

Before the patient is moved he should be treated for possible shock. Fractures should always be splinted.

Stretchers. The army type is easy to handle. It can be used as a cot at the scene of the accident, in transit, and at the first-aid room or hospital. It is frequently stored in a canister in a conspicuously marked spot to keep it clean and ready for use.

Collapsible stretchers may be folded when not in use and carried in an automobile. Some are equipped with wheels and an adjustable head rest.

Bandages, splints, and stretchers may be improvised in emergencies when regular equipment is not available. Improvisation is part of first-aid training. Where men are at work, however, ap-

FIRST ON BURNS

. . . a complete emergency burn treatment

Spray F.O.B. over burned areas . . . instantly, pain is relieved. F.O.B.'s antiseptic action prevents infection. Safe to use even around eyes or mouth. Contains no acid, alcohol or benzocaine. *Write for clinical reports and test results.*

BULLARD'S FORMULA

. . . a treatment and preventive for Poison Oak and Ivy.

Contains the natural mineral Hectorite. It is odorless, greaseless, and harmless on any part of the body. Bullard's Formula provides a protective film that gives instant relief from itching and checks weeping lesions. Packaged in pocket size polyethylene tubes. *Test photos on request.*

NEUTRALIZE

. . . inactivates effects of chemical irritants.

Neutralize stops action of chemicals splashed in eyes or on skin between time of accident and arrival of doctor. Unlike water that only dilutes harmful chemicals, Neutralize is a buffer that instantly counteracts acids and alkalies. *Write for complete technical details.*

E. D. BULLARD COMPANY *Sausalito, California*

BULLARD
INDUSTRIAL SAFETY EQUIPMENT

Circle Item No. 196—Reader Service Card

proved first-aid equipment and supplies should be kept on hand.

First-Aid Training

The American Red Cross first-aid textbook and the U. S. Bureau of Mines manual of first-aid instruction are recommended for teaching first aid. It is often found that accidents are less frequent among persons trained in first aid and it is advisable to have as many employees as possible receive this training. * * *

Health Agencies

Among agencies furnishing helpful data on general and specialized phases of medical service, first aid and industrial hygiene are:

United States Public Health Service

United States Department of Labor

American Standards Association

Industrial Hygiene Foundation

Atomic Energy Commission

State and municipal health departments.

Resuscitation

Methods and Equipment

PROMPT application of artificial respiration by trained persons has saved the lives of thousands of victims of suspended breathing due to asphyxiation, drowning, electric shock, and other causes. Many methods of manual resuscitation have been used and in recent years effective mechanical devices have been developed.

The arm-lift, back-pressure (Holger-Nielsen) method has been adopted officially by the American Red Cross and other organizations. Instructions will be found in newer first-aid manuals and in pamphlets issued by public utilities and other industries.

The back-pressure hip-lifting method, proposed by John H. Emerson, is used by many industries and organizations as an official or alternative method. This method has advantages in near-drowning accidents because lifting helps to drain water from the stomach and air passages.

It is also valuable for electric shock cases where burns of hands and face are common, and in other injuries where manipulation of the arms may be difficult or dangerous.

Pole-top resuscitation, used by public utility companies, has proved valuable in resuscitating victims of electric shock. Its use avoids the loss of vital time while lowering the patient from the pole. When he is on the ground another method is substituted.

These methods can be applied immediately without apparatus, which is important in all cases of suspended respiration. They are more efficient than the Schafer prone-pressure method which was widely taught for many years and saved many lives.

Mechanical resuscitators are used by fire departments, hospi-

CONTENTS — sterilized bandages, compresses, gauze of varying types and sizes, tourniquet, forceps, burn ointment, splint, iodine applicators, aromatics and related supplies.

CABINETS — dustproof, moistureproof, wall-mountable, portable, electrically welded of 20-gauge heavy-duty steel. DROP COVER serves as convenient utility shelf.

4 AVAILABLE SIZES — containing from 10 to 36 replaceable units, packed in related multiples to meet potential contingencies.

WHAT HAPPENS?

What protection does your plant provide should an accident occur while part-time physician or nurse is away from the premises . . . an important point also for the small shop without medical facilities.

PAC-KIT® provides FIRST AID . . . on-the-spot

Cabinets contain supplies and accessories for instant application in burns, lacerations, eye injuries, gross bleeding, fainting, fractures, and allied injuries common to industry. Contents readily applied by average employee. Assures immediate relief for injured until medical assistance can be summoned.

PAC-KITS are goodwill builders, too. Strategically located they improve management-employee relationship . . . visitors and insurance underwriters are impressed.

WRITE TODAY for complete descriptive literature and prices.

The PAC-KIT Company • P. O. Box 1306, Greenwich, Connecticut

Circle Item No. 197—Reader Service Card

tals, and some industries where asphyxiation or electric shock hazards are serious and where apparatus and trained personnel are available immediately.

Such apparatus can be used where injuries to the patient might prevent use of manual resuscitation. It also gives more air exchange and does not get tired.

Mechanical resuscitators are for use only by persons trained in their operation.

The inhalator, which supplies oxygen to the patient under low, continually positive pressure, is used with manual resuscitation. It is particularly valuable in cases of gas asphyxiation and has become part of the equipment of fire departments and rescue squads. The inhalator by itself does not produce respiration and should not be confused with mechanical resuscitators.

Pure oxygen, rather than the mixture of oxygen and carbon dioxide formerly used, is recommended by the Council on Physical Medicine of the American Medical Association.

Some types of apparatus combine the functions of resuscitator, inhalator, and aspirator, restoring breathing, administering oxygen and removing from the throat secretions which might hinder breathing.

Application of manual resuscitation should never be delayed while waiting for apparatus. * * *

Know Your Snakes And Be Prepared

Most snakes, fortunately, are nonpoisonous. There are only four venomous kinds native to the United States. Only one is found in all sections of the country.

Snake bite is not one of the more common causes of injury or death but those who work in snake-infested regions should wear high boots or leggings and carry snake-bite kits and know how to use them. Industries most subject to this hazard include construction, petroleum, public utilities, and agriculture. Vacationers in these areas should follow the same precautions.

Snakes have been known to go out of their way to attack humans but most of them merely want to be left alone. The danger is in coming up to one unexpectedly and the snake strikes in self defense.

Three types of snakes are called "pit" vipers because of a pit or indentation between the nostril and the eyes. In this family are the rattlesnake, the copperhead, and the moccasin.

Except for some types of rattlers which become 6 feet long, pit vipers have short, thick bodies and stubby tails. Their heads are blunt and shaped somewhat like an arrowhead. Their necks are pronounced, as contrasted with the slimmer bodies, less pronounced necks and long, slim tails of the nonvenomous snakes. Venom is injected through two hollow fangs.

Venom of the pit vipers is slow acting. Its full effect may not show up until several days after the bite. It attacks the victim's blood.

The coral snake resembles the nonpoisonous snakes in shape. It is small and rodlike. Its seemingly headless body is banded by alternate bands of brilliant black and red, separated by narrower bands of yellow.

Like the cobra and mamba, the coral snake does not have fangs. Its teeth are grooved and venom flows into the wound through the grooves. A bite looks like a semicircular series of pinpricks, in contrast to the two fang punctures made by a pit viper. The quick-acting venom attacks the nervous system. Fortunately it carries a comparatively small charge of venom.

The coral snake is semi-tropical and is found in Florida and in the states along the Gulf of Mexico and in the desert areas of the Southwest. A burrowing snake of nocturnal habits, it is not often seen.

Rattlesnakes range in size from the small prairie rattler to the 6-foot diamondback. Some type is found in every section of the United States. Its rattles usually give warning before it strikes but it isn't safe to count on it.

The cottonmouth moccasin is found in the streams, marshes,

EMERSON Resuscitators

"Simplest and Safest"

SIMPLE to operate.

SAFE for adults, children or infants. Accepted by the American Medical Association on May 30, 1942, for use by trained laymen as well as doctors.

VERSATILE. Rugged, dependable Emersons come in many models—for dispensaries, ambulances, factories, mines and general rescue. Extension hoses can bring the breath of life to victims in almost inaccessible places, hundreds of feet from the oxygen tanks. Speed is essential in breathing emergencies. An Emerson can help you save lives.

NOTE: The first few minutes after breathing has ceased are the most critical. Manual artificial respiration should be started immediately and continued until the resuscitator is in use.

For free bulletins, *Medical References on Resuscitation, Emerson Method of Artificial Respiration* and *Emerson Resuscitators for Industry,*

write:

J. H. EMERSON CO.
CAMBRIDGE 40, MASS.

Circle Item No. 198—Reader Service Card

and swamps of the Southern states. When surprised, it coils, draws its head back, and opens its mouth wide, showing the white parts of its mouth; hence its name "cottonmouth."

The copperhead is an upland snake. Its habitat is the rocky cliffs that border streams of the Appalachian Mountains It gets its name from the coppery color of the top of its head. It is sluggish and often allows the victim to walk within striking range before it moves.

Don't Neglect Strains and Sprains

A fracture is always treated with respect. Unfortunately, there is a tendency to regard any injury in which no bones are broken as something trivial—though painful.

A lame back, wrist, ankle or any painful joint or extremity should be examined and treated without delay.

The injury may be more than a strain—a fracture, a slowly developing chronic infection, a disease of the joints, or a sign of trouble at some distant point.

Injuries in which the skin is not broken are more easily disregarded than open wounds. There is a temptation to "work off" a sore back or knee, but rest of the strained part is essential.

A sprain or strain is actually a wound—a tear of muscles or ligament. This tear must heal solidly before pain will disappear and strength return. * * *

Beware of Poison Ivy

Poison ivy and poison oak have spoiled many an outing and caused numerous cases of disability among farm, construction, highway, and public utility workers. A wise precaution is to avoid contact with any plant having clusters of three leaves.

Some persons seem able to touch poison ivy without effects; others are poisoned by the slightest exposure and these cases are often difficult to cure.

Poison ivy and poison oak produce an oil which is extremely irritating to the skin. The poison may be carried by clothing or insects or by smoke from burning plants.

Symptoms usually appear within 7 to 10 days after exposure. The blisters are filled with pus which spreads the infection through scratching. If neglected, the rash may spread over a large portion of the body, causing high fever and great discomfort.

If a crew has men who are immune, they should be sent ahead to clear the path of poison plants. However, immunity is not always permanent.

As soon as possible, exposed areas should be washed thoroughly with hot water and soap —preferably laundry soap. Make a thick lather several times but do not use a brush. That would make the injury more severe. If possible, wash affected areas with rubbing alcohol and rinse with clear water.

If a rash develops in spite of

only 8¼" HIGH!

NEW
Washington Ambulance COT!!

Now you can get an ambulance cot that is REALLY LOW — only 8¼ inches high — the perfect answer for cars that have less head room, and for overhanging stretchers. The new Washington model 21-L is of special value for heart cases, and other patients who must be kept in a sitting position. Washington's famous top-quality craftsmanship is apparent throughout this new model cot with such features as sturdy, rigid construction . . . highly polished aluminum tubing and castings . . . very lightweight yet strong . . . trigger release side rails . . . adjustable back rest with nine-position squeeze-lock adjustment. It always pays to choose Washington for the newest and best in all emergency room or vehicle requirements.

ADJUSTABLE-BACK EMERGENCY STRETCHER MODEL 9AB

Four adjustable positions on back rest, folds to only 4½ inches high! One of Washington's complete line of folding emergency stretchers for every need, in every price range.

NEW PUSH-TYPE COT FASTENER MODEL 3A

This new and improved cot fastener holds cots securely in station wagons and other types of emergency vehicles. Washington makes four other models of cot fasteners, to meet every need for any kind of vehicle. Tell us the make and model of your vehicle, and we'll recommend suitable fasteners.

See your jobber or write for FREE catalog!

Washington Products Co.
WASHINGTON COURT HOUSE, OHIO

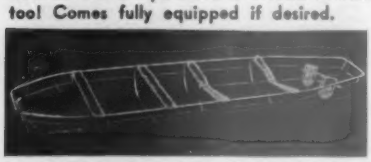
Circle Item No. 199—Reader Service Card

JUNKIN
STRETCHERS

STRETCHER CASE

YOUR PLANT NEEDS STRETCHERS

The Junkin Stretcher Case affords a convenient and compact cabinet for storing the army type stretcher, blankets and first aid equipment. It provides a definite location for the equipment and protects it against the deteriorating effects of dirt and grime. And because it's compact it's a SPACE SAVER too! Comes fully equipped if desired.



JUNKIN SPLINT-TYPE STRETCHER

Construction permits patient to be carried horizontally or lifted vertically without danger from inaccessible locations. Canvas straps and footrests keep patient rigid and comfortable. For complete information write for free descriptive literature.

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ENGINEERED SAFETY
SAFETY APPLIANCE CO.
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LOUISVILLE 2, KENTUCKY

Circle Item No. 200—Reader Service Card

this treatment, medical attention may be needed. Mild cases are often cured by washing with hot water and soap, then with rubbing alcohol, followed by application of a 5 per cent solution of ferric chloride. The solution should be applied once or twice a day until the rash disappears.

The ferric chloride solution will often act as a preventive on parts that have been exposed.

Cleanliness in the First-aid Room

Surgical cleanliness of instruments and materials and rigid precautions during treatment are of extreme importance.

To the physician and nurse, cleansing hands thoroughly and keeping equipment and supplies free from contamination have become second nature. The first-aid attendant, called from his job to treat an injury, may overlook these important precautions.

Supplies (bandages, gauze, instruments) should be kept in cabinets. Supplies purchased in packages remain sterile until opened. Unit dressings are favored in many dispensaries under medical supervision and should always be used when a part-time attendant is in charge and for isolated groups.

With individually packed dressings there is no waste and no contamination of unused supplies. A useful item is the finger compress which can be applied without touching the part next to the wound.

After the treatment, instruments should be cleaned and sterilized and allowed to dry. Soiled dressings should be disposed of out of sight of patients. A closed can with self-closing, foot-operated cover is useful.

Forceps, tweezers, and other instruments should be subjected to boiling water or live steam in sterilizers. Boiling for 10 minutes is advised.

Hands cannot be made absolutely sterile but reasonable standards should be maintained. While unit dressings make it possible for a person with dirty hands to apply a dressing without contaminating it, only an emergency would justify it.

Clean towels (cloth or paper) and soap, preferably liquid or powdered in a dispenser, should be available. A nail brush should be used.

Here is recommended washup procedure:

1. Clean finger nails by scrubbing with soaped brush and warm water, up and down the nails and across the finger tips.
2. Then scrub inside of hands and between fingers.
3. Then outside of hands and arms beyond the elbow. A short-sleeved shirt or jacket is recommended.
4. Rinse so that water runs off the elbows. Finally, wash with a sponge dipped in alcohol.

Patients' clothes or hands should not come in contact with a wound. Wounds may also become infected by secretions from nose or throat.

If extensive treatment of a wound is indicated, severe bleed-

ALL PURPOSE PROTECTION

in respiratory emergencies
STEPHENSON
"MINUTEMAN" RESUSCITATOR
Simple Dependable Safe

Designed for quick service when breathing accidents occur, such as smoke suffocation, gas poisoning, drowning, shock, heart attack, etc.

No industrial plant should be without this protection.

Write for FREE demonstration or pamphlet N-403

STEPHENSON CORPORATION
RED BANK NEW JERSEY

Weighs only 30 pounds.

Represented in Canada by Wilson & Cousins, Toronto

Circle Item No. 201—Reader Service Card

ing should be checked, the patient placed in a comfortable position, and the injury covered temporarily while waiting for a physician.

Shelter for Men And Equipment

Orange-colored, heavy-duty tarpaulins used by Consolidated Edison Company of New York provide protection from rain or snow for workmen and their equipment on manhole repair work in the city streets. Made of Krene vinyl film laminated to both sides of a nylon fabric interlayer, the new tarpaulins are resistant to mold and mildew, and can be folded and put away wet without fear of rotting and decomposition. They are light in weight and easy to handle—covering 12 by 18 feet, each weighs about 25 pounds.

Krene vinyl film is highly resistant to moisture penetration and to staining by grease and oil. Dirt and grime can be wiped off with a damp cloth to restore the safety color. Bright colors, emblems and insignia are readily printed on these materials. The laminated material has high tensile strength and durability. It does not support combustion. If accidentally punctured with a sharp tool or piece of wire, it can be repaired easily with an adhesive or plastic patch. The tarps have grommets around the edge at 2-ft intervals for fastening the cover in place. When used to protect a manhole, the cover can be tied to metal stakes or to flagstand-base stanchions. At night, a light inside shines through to provide extra warning of an obstruction in the street. Tarps used over supplies stored out of doors may be lashed down in the conventional manner.

Smoke Can Kill As Well as Flame

Some 74 per cent of all dwelling-fire victims die upstairs from downstairs fires—asphyxiated by toxic gases—according to the National Fire Protection Association. In public buildings too, and among firemen, smoke, hot gases, and toxic fumes take their toll.

Worst concentrations of carbon monoxide are usually found in the first stages of a fire, especially in a slow starter. (Two breaths of air containing 2 per cent CO can kill in 3 minutes.)

A smoky fire in a confined place is best left alone. Close the door

Wood Sole Acts As Splint

Reece Orthopedic Shoe

for Injured Feet and Broken Toes

- Lightweight WOOD SOLE with air-foam insole acts as SPLINT.
- Canvas upper—white or olive drab laces easily over any size bandage.
- Saves time for doctors, nurses and patients. Order Today.

No. 175—C.G. Men's
No. 173—C.G. Women's
Sizes—Small - Medium - Large
Easily stocked—can be worn on either foot—no lefts or rights.
Guard prevents re-injury. Available without guard.

REECE WOOD SOLE SHOE CO.
Dept. N.S. 3-58 Columbus, Nebr.

Circle Item No. 202—Reader Service Card

SELF-ADHERING
GAUZTEX
PREVENTION AND CURE

1. *Gauztex Industrial Tape*
Gauztex sticks to itself—not to you. The ideal protective covering when your work deals with abrasives or sharp edges. Open mesh to allow skin to breathe adds to natural "feel." The adherent adds to "grip." Both add up to protection that speeds production. Available in regular and oil resistant to meet job conditions.

2. *Gauztex Sterile Bandage*
Eliminates painful pull, will not stick to hair, skin, or clothing. Saves time, makes a compact bandage even in hard-to-bandage places. Open gauze mesh allows the skin to breathe—heal faster.

Here's all you do to protect and help heal.

1. LOCK IT!
—by overlapping and pressing together.

2. WRAP IT!
—sticks to itself not to you.

Send for FREE Sample

General Bandages, Inc.
531 Plymouth Court
Chicago 5, Ill. Dept. NS-3
Please send sample roll and information on:
____ Gauztex Industrial Tape
____ Gauztex Sterile Bandage
Firm_____
Title_____
Address_____
City_____ State_____

Circle Item No. 203—Reader Service Card

and call the fire department.

The danger of smoke cannot be judged by its color or density. Thin smoke may be toxic.

Air near the floor may be coolest but it may contain poison gases (such as hydrogen sulfide) which are heavier than air.

When escaping through smoke it is better to breathe deeply two or three times rather than to just gulp a single breath and run. Deep breaths can be held much longer.

CO, even in small amounts, affects a person's reasoning. Anyone who has been through a fire, therefore, should be watched carefully. Persons having escaped from a burning building have been known to run back in.

Application of resuscitation and oxygen inhalation equipment have saved the lives of many victims of asphyxiation by combustion gases.

Tolerance: That uncomfortable feeling that the other fellow may be right after all.

NEW!

REINFORCED PLASTIC

STRETCHER CASE

Corrosion Resistant

Permanent Finish

Cast-On Lettering

Acid Proof

Not Affected By Moisture

Tough

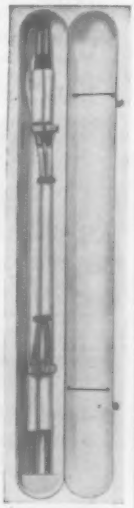
Durable

Conspicuous

Vertical or Horizontal Mounting

White or Yellow

Full Size 95" High 9" Dia.



Manufactured By

OSBORN MANUFACTURING CORP.

Dept. RE-1 WARSAW, INDIANA

Circle Item No. 204—Reader Service Card

MEDICAL FACILITIES
Recommended Standards

1. In plants of 500 or more, a full-time nurse should be in attendance. A physician should be present at the daily "dressing hour."

2. Number of treatment rooms:
   50 to 500 employees 1
   500 to 1000 employees 2
   1000 to 5000 employees ...3
   5000 to 10,000 employees .5

3. For plants of more than 1,000 employees the dispensary should be equipped with bath and toilet, equipment for minor surgery, and other apparatus and supplies selected by the physician in charge.

4. One or more beds should be provided where severe cases may be made comfortable during opservation or while waiting for transportation to a general hospital.

5. An x-ray room should be provided if facilities are not available in a local hospital or physician's office.

6. The hospital should be under full charge of the company physician.

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Circle Item No. 205—Reader Service Card

BURN-QUEL

AEROSOL BURN SPRAY

Burn-Quel was designed to provide immediate relief to burns and scalds by means of a fine, aerosol Spray. The all-oil formula eliminates the necessity of cleaning the affected area prior to treatment.

Burn-Quel is packaged in an attractive, hand-sized, non-breakable, 2 oz. plastic bottle.

For your FREE sample and descriptive literature, send us your name under your Company letterhead.

A. E. HALPERIN CO., INC.

BOSTON 18, MASS.

YOUR SAFETY — OUR BUSINESS

IN SECTION 11:

Promotion and Training . . . 260
Safety Signs 263
Planning Effective Meetings . 268
Medical and Accident Records 269

IT USED TO BE called "education"; now it's "communication." It means getting ideas across to people, improving both their attitudes and their know-how.

Communication uses a variety of media and techniques. Oldest of safety media is the bulletin board, and it's still useful. The employee publication is another which is steadily improving in its presentations.

Pictures on a screen are invaluable in any training program. Slidefilms and motion pictures — color or black and white, silent or talking — can be rented, purchased, or borrowed from several agencies.

With even a low-priced camera, much helpful material can be obtained on color slides for projection and black and white pictures can be taken for publication and bulletin board use.

Another important medium is the stock sign which carries warnings or instructions.

11

SAFETY PROMOTION and TRAINING

Training and Maintaining Interest

How to create and keep a positive outlook among employees

A GOOD WORKMAN needs a good kit of tools. The man whose job it is to train others needs tools for his job, too. Some of those tools are:

1. Employee manuals.
2. Motion pictures and slidefilms.
3. Bulletin boards and posters.
4. Easels and flipcharts.
5. Employee publications.
6. Instruction cards.

Training aids can help the safety program in several ways: By improving the effectiveness of instruction in safe work practices; by developing sound attitudes toward accident prevention; by supplementing and strengthening on-the-job training.

Safety is so closely associated with efficient operation that much of the instruction serves a double purpose.

Employee Manuals

These booklets tell the employee what the company expects of him and what he can expect of the company. Safe practices, work rules, group insurance, medical service, personal service facilities, and other details of employment are explained. There is a growing tendency to avoid the word "rules" in referring to job practices.

Manuals range from simple mimeographed booklets to elaborate illustrated books. Cartoons give a friendly, informal tone to instruction and make rules seem less forbidding.

Films

Both motion pictures and slidefilms are valuable for training classes and meetings. Types of films include:

1. Strip films projecting individual frames, with the instructor adding the commentary.
2. Sound slidefilms using a similar strip, with disk or tape-recorded commentary.
3. Separate projection slides with either live voice or recordings.
4. Sound and silent movies.

Slidefilms can often be made from photographs taken on the job with amateur equipment. Modern color photography adds realism and attention value to slides and movies, but black and white pictures are useful for some subjects which do not lend themselves to color.

Movies require more expensive equipment and greater skill in their production but short amateur movies have a place in the program.

Most motion pictures, however, will have to be obtained from outside sources. A variety of films can be rented. Many are available through the National Safety Council, which issues an annual list of available movies and slidefilms.

Projection Equipment. Projectors for individual slides, slidefilms, and motion pictures with and without sound equipment are available in a wide range of prices. Satisfactory equipment can be obtained at a cost within reach of even the small plant.

An overhead projector can be used in a lighted room. An instructor can draw or write with a grease pencil on a piece of acetate or film positive in front of him. He can point to any important phrase or part of a picture. He faces the audience while the image is projected through a lens onto the screen.

Screens are available in a variety of sizes and prices. The size of the meeting room will govern the choice. A beaded screen is more brilliant over a narrower viewing angle and is suitable for general use. A matte screen is better for shorter rooms where the audience is spread out.

Photography

A camera can provide much useful material for the safety program. Slides in black and white and color and enlarged prints for bulletin board and employee publication use are easy to produce.

Still cameras are available in a wide range of prices. These include:

NSC JUMBO POSTER forms the center of a striking display.

A SCREEN for projecting slides or movies has a pegboard on each side for posters or home-made displays. Plan could be used for plant meetings or convention exhibits.

Subminiature—Taking negatives from 8 x 11 to 12 x 17 mm.

35 mm.—Preferred for color slides which fit standard projectors.

Twin lens reflex—Negatives on 120 or 620 film, 2¼ x 2¼ in. make satisfactory enlargements in black and white.

Press camera—The 4 x 5 in. is the most popular size. Prints are large enough for many uses without enlargement but equipment is rather bulky for amateur use.

One-minute cameras—The Polaroid-Land process produces finished prints one minute after the shutter has been snapped. These are useful when a photographic record of the subject is wanted immediately and extra copies are not needed.

Simple cameras with fixed-focus lenses will often take excellent pictures under favorable conditions but good industrial pictures often require a more versatile camera and a certain amount of skill.

Cameras of all types are available with flash synchronization which makes them independent of outside light sources.

Miniature cameras with fast lenses using fast film can also take many pictures by available light when a flash might be undesirable.

Bulletin Boards

Bulletin boards in prominent locations are excellent media for official announcements and news as well as for safety information and reminders in the form of posters, charts, photographs, and exhibits of protective equipment.

CARTOONS add life to bulletin board displays and employee publications.

In companies without employee publications bulletin boards serve some of the functions of a newspaper.

Unimaginative or unsystematic use of boards impairs their effectiveness. Here are a few suggestions for enlivening the displays:

—Locate them where they will be seen (cafeterias, recreation rooms, elevator entrances, locker rooms, near time clocks or drinking fountains).

FIRE BRIGADE CHIEF uses the simplest of audio-visual aids to present his story. On the chalkboard is an outline of his talk. Volunteer shows mask to group.

A SUGGESTION SYSTEM can be the source of many practical ideas for the safety program and for job improvement.

—Change copy frequently. Some companies allow posters and other copy to remain for a week, but a better plan is to change them as often as every two days. Fresh displays always attract more attention.

—Keep copy brief. If possible, use less than 100 words for notices and news items.

—Use large type, art, and color. Humorous cartoons are especially popular.

—Keep as near eye level as possible — about 63 inches from the floor.

—Provide good illumination. Flashing lights attract attention and are sometimes used in nonproducing areas. They may be an objectionable distraction in work places.

—Glass covers protect displays from dirt and defacement and prevent the posting of unauthorized material.

—Don't fill up boards too solidly with printed matter. Liven them up; don't make them too dignified.

Safety posters are visible evidences of an accident prevention program. Unfortunately, some companies have depended on posters to carry the load and neglected such essential activities as guarding and job instruction. If posters are not backed by sincere effort to eliminate hazards, employees will have little respect for the safety program.

The value of posters is emphasized by the efforts of advertisers to acquire billboard space near factory gates. These locations are frequently used for large safety signboards where both employees and the public can get the message. Outdoor boards are made more effective by floodlighting.

A convenient size for a bulletin board is 22 in. wide by 30 in. high.

Boards should be attractively painted and glass covered. Green, traditional safety color, is commonly used but there is no reason why other colors should not be used. One board in a workroom is usually sufficient but in lunch rooms or locker rooms several panels may be used effectively.

Bulletin board displays need not be limited to safety posters. Any subject of interest to employees and management may be used on the boards. In fact, safety posters may have a stronger appeal if displays include other subjects.

One poster alone doesn't do the job. It takes the continual impact of the program. Different posters will appeal to different persons and to different moods in the same person.

Sometimes a special display may be used to launch a campaign on a theme, such as eye protection or safety shoes.

Notices may inform employees about matters of local interest, such as comparative safety records and contests and reports of accidents and near-accidents.

Displays of broken goggles and damaged safety shoes and hard hats are interesting and convincing when accompanied by stories and pictures of the workers involved. But object lessons can become monotonous and it takes ingenuity to find new ways of presenting familiar subjects in a fresh way.

Posters, if carefully handled, can be rotated to three boards. They should be discarded when showing signs of wear. Displays should maintain standards expected of advertisements of the company's products.

Posters bring eye-arresting splashes of color and safety messages to the bulletin board. Often poster displays will catch the new employee's eye on the way to his department. These graphic displays will inform, remind, and often amuse, since an occasional light touch has been found effec-

—To page 264

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Signs for Instruction, Direction and Warning

THERE'S A SIGN for nearly every industrial situation; special signs can be made to order. These conform to the ASA Code for design and color.

ATTRACTIVE, quickly-read signs make safety easy to buy. Any display concerned with safety should be the freshest, brightest thing in sight. Every day—at work, in public places and on the highways—we rely on signs for instruction, direction and warning.

Shape, color, wording, and location are characteristics which make signs stand out conspicuously against their surroundings. Recognition of these elements in commanding attention has led to adoption of standards that promote uniformity of design and color.

Some signs, because of their distinctive shape, immediately register their messages. Even illiterates can often grasp the meaning at a glance. Examples are the octagonal stop signs at highway intersections and the cross-buck signs at railroad crossings.

Color. According to American Standards Code Z35, *Specifications for Accident Prevention Signs*, characteristic colors for signs should be:

Red—warning of special dangers.

Yellow—caution; possible dangers or unsafe practices.

Green—safety instructions.

Black—directional signs, such as arrows pointing to exits and stairways.

For informational signs any colors except red and yellow may be used.

Commercial signs conforming to specifications of the Code and covering a variety of messages for nearly every industrial situation are available and special signs can be made to order. Enameled metal, the most frequently used material, is resistant to rust and corrosion and is easy to keep clean.

Visibility of warning signs is a requisite. Special illumination may be necessary in poorly lighted areas.

Black on white and black on yellow are the most visible combinations. Other combinations are white on black; yellow on white; blue on white; white on blue.

Yellow is the most conspicuous color in daylight; red can be seen most readily by artificial light.

Red is universally accepted to denote danger or fire apparatus. This should always be considered in choosing color combinations for danger signs. Color's force should not be weakened by indiscriminate use.

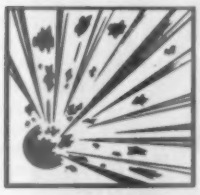
Color combinations that contrast with surrounding colors should be used so they will stand out clearly. Use only permanent colors.

Location is an important factor, and a warning sign is ineffective if it cannot be seen easily or if it is too far from, or too close to the point of danger.

Wording of signs should be brief, clear, and understandable to persons with limited vocabulary.

Whenever nature of the hazard may not be evident, the sign should if possible, specify the danger, such as "Gasoline Storage."

The shorter the wording the better, but many persons resent a brusque order, however impersonal it may be. The best sign will, if it expresses more than a mere stereotyped phrase, like *stop* or *slow*, invite cooperation rather than demand conformity.



Danger of explosion
Danger d'explosion
Peligro de explosión

Danger of ignition
Danger d'inflammation
Peligro de inflamación

Danger of poisoning
Danger d'intoxication
Peligro de intoxicación

Danger of corrosion
Danger de corrosion
Peligro de corrosión

Dangerous radiations
Radiations dangereuses
Radiaciones peligrosas

INTERNATIONAL danger symbols were proposed by the International Labor Organization, may be read in three languages or understood by illiterate workers.

Lettering should be as large as possible, consistent with balance and legibility. Block letters generally are preferred for signs.

The weight of line in the body of each letter should be about the same as the space between lines.

Tables of distances at which well-proportioned letters can be read by persons with normal vision under good lighting conditions are given in the American Standards Code. This code also offers detailed specifications on construction of standard signs.

Danger signs should be restricted to such immediate and serious hazards as high-voltage equipment, toxic and corrosive chemicals, collision hazards, explosives. Employees should be warned of the importance of such signs.

Caution signs warn employees of potential hazards, such as improper use of elevators, cluttered aisles, and sparks from grinding wheels; or against unsafe practices such as oiling machinery in motion, smoking in forbidden areas, and operating machines without guards.

Workers should be trained to respond to caution signs as an indication of potential danger requiring care and alertness. The difference between the *danger* and *caution* signs is one of degree.

Other general types include safety instruction signs, which designate certain actions or practices; directional signs, and information signs.

Reflectorized signs are useful day or night. In darkness they stand out brightly under the beams of a flashlight. They are available in standard designs for warning, direction, and locating emergency equipment.

Maintenance. Periodic inspection and inventory of signs should be part of the safety program. Signs should receive the same cleaning and maintenance that is given to other equipment. Dirty, disfigured signs are not convincing.

Signs no longer needed should be removed. Where hazards have changed, signs more appropriate to present conditions should be substituted.

Warning tags come in a variety of stock subjects. They are attached to equipment in emergencies to warn others that men are working on machines, that a valve on a pipe line has been shut because of a leak, etc. They are also used on unsafe equipment which is to be removed from service.

Decals are miniature signs which can be attached permanently to machines, walls or other places where a message of warning, caution, or brief instruction is needed. They conform to standard specifications of design and color.

Signboards with changeable letters are available in small sizes suitable for departmental use and larger types which may be erected in conspicuous places near the plant entrance where they can be seen by both employees and the public.

These boards may be used for brief safety messages and for recording the plant's record of no-accident days. * * *

Promotion and Training

—*From page 262*

tive in getting across serious thoughts.

Jumbo posters, 8½ x 11 ft., are often placed on boards in conspicuous locations where the employee cannot fail to see them when coming to work or leaving the plant. If they can be seen by the public passing the plant, they will also help to make a favorable impression.

Jumbo posters may be obtained from the National Safety Council on a monthly service basis. Billboards may be decorated with original art work, perhaps including a scoreboard for the plant's record of accident-free days.

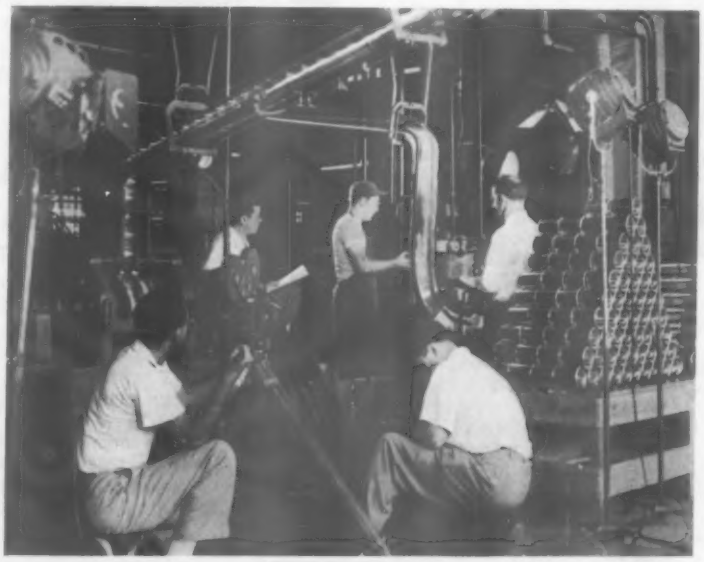
Easels and Flipcharts

Easels and flipcharts are helpful in conducting meetings. Examples of this type of material are the National Safety Council's *Safetygraphs*, each dealing with a specific topic. They are designed for use by foremen and others in holding meetings with small groups.

Safetygraphs are collections of drawings, cartoons, charts, and other illustrations printed on heavy paper and spiral-bound in a folder that opens to form an easel. With the large illustration facing the audience, the instructor discusses the subject, using his own words or reading the suggested talk on the back of the illustration.

Safety Instruction Cards

Cards 3 x 5 in. covering safe methods for practically every type



MOVIES and slides—black and white and color—can be taken on the job to provide a medium for safety instruction and communication.

"Mrs. Stubbe's 39 pupils at rural Castody School near Wausau can bring their saved-up pennies and nickels to school on weekly Stamp Days. I was impressed how the appointed 'bankers' collected the money—$11.76 that day—and then ordered the Savings Stamps. When the 'bank' closed, we drew pictures and talked about highway safety."

Wausau Story

by **GEORGE W. WALKER**

Vice President and Director of Styling

FORD MOTOR COMPANY

"When people hear I'm a stylist, they usually ask me what that means. Mrs. Stubbe's pupils thought it meant drawing pictures of automobiles and they decided I had a pretty easy job.

"Believe me, there's more to styling than drawing pictures. I know because I've had a hand in styling some three thousand or more different products of all kinds. Our work is to make products look the way users *wish* they could look, fill needs users *wish* they could fill. That means 'reading minds', interpreting trends, working with engineers and merchandising men . . . and then designing products that are more useful and more attractive and therefore, more desirable.

"And don't forget this: People have confidence in what you offer if you're proud of it yourself. Maybe styling is responsible for that pride . . . or, as I found out during my visit to Wausau, it might be something not quite so tangible. The people who live in Wausau are proud of their community. They should be. It's clean, bright, friendly . . . a happy place to live and to work."

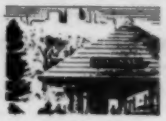
"Wausau Motor Parts Company is a 35-year-old manufacturer of piston rings, sealing rings, and valve seat inserts. I'm told this company is one of the oldest policyholders of Employers Mutuals. When George Landon, President of Wausau Motor Parts, showed me around the new plant, we watched Bob Klos check a piston ring. I appreciated seeing how these parts are made and inspected because they go into cars like the one I'd parked outside."

"Four wheels and a place to sit. That's all it takes to make my two young Wausau friends proud of their car. But in a few years they'll demand a car that has convenience, comfort, safety and the best styling on the American Road."

Employers Mutuals appreciates Mr. Walker's visit to Wausau. Yes, we are proud of our community. Our Company was founded in Wausau—our home office is here—and it's also the inspiration for our way of working, everywhere we work.

Employers Mutuals, with 102 offices across the country, writes all lines of fire and casualty insurance. We are one of the largest in the field of workmen's compensation. For further information see your nearest representative (consult your telephone directory) or write us in Wausau, Wisconsin.

Employers Mutuals *of* Wausau



"Good people to do business with"

Circle Item No. 206—Reader Service Card

of industrial operation, as well as seasonal and off-the-job subjects, are issued to employees as part of their job instruction. Often they are placed near the bench or machine to serve as reminders.

While the messages on most instruction cards are rather long to serve as posters, some companies make enlarged photostats of the cards and mount them on bulletin boards.

Employee Publications

Employee publications furnish an excellent medium for safety communications. These publications range from simple mimeographed bulletins to elaborately printed and illustrated magazines. Illustrated safety stories are regular features in some publications.

Most publications carry news of employee and company activities but some are strictly safety bulletins for employees, supervisors, and special groups. * * *

Not Rules, but Guides

Manuals outlining company policies and working conditions have long been used in employee induction. These booklets may cover general matters dealing with employer-employee relationships, including safety, medical and health service and related topics. Sometimes a smaller booklet containing only safety suggestions is issued.

In most companies, stiff, formal lists of rules have been replaced by friendly, helpful explanations of company policies for employee guidance. Whimsical cartoons can make even orders seem less arbitrary.

Putting this information in print in itself indicates that management is interested in accident prevention. It also is more reliable than verbal instruction.

Books are not a substitute for personal supervision, but it helps the supervisor to have the information in printed form.

Printed rules should be introduced by management endorsement and brief explanations of why rules are necessary, pointing out how the employee gains by safe work practices.

Text should be worded as simply as possible. Simplicity is achieved by being accurate, clear and brief.

Rules should be reviewed at intervals to consider adding new items brought about by changing conditions and altering or deleting those that may no longer be applicable. Sometimes it may be found that new rules are not

Steelmen Stage Safety Show

STEELMEN turned actors at the National Safety Congress when representatives of Republic Steel Corp. and U. S. Steel Corp. showed how to handle hazardous gas problems.

Four men from Republic's Cleveland steel plant and twelve from the Chicago steel plant simulated on the stage of the Conrad Hilton Hotel's Grand Ballroom the precautions that are taken when working with gas.

Following the Republic presentation, the South Chicago Works of U. S. Steel, with a cast of nine, simulated a rescue operation.

Titled "Planning the Gas Job," the Republic presentation was divided into two scenes. The first was a meeting of the Cleveland steel plant's gas committee which plans the work which must be done on a 24-inch coke gas line to blank off or stop the flow of gas through it while two new connections are made. The second scene showed workmen in a pit at the steel plant actually working on the line.

The U. S. Steel demonstration was titled "Emergency Aspects of the Gas Job." The first scene is devoted to an explanation of the functions and the need for the gas rescue team in blast furnace operations. The second scene showed how a rescue team swings into action when a workman is overcome by gas in a pit.

What is the Bell System?

The Bell System is wires and cables and laboratories and manufacturing plants and local operating companies and millions of telephones in every part of the country.

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It is more than that. **The Bell System is an idea.**

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You could have all the equipment and still not have the service you know today.

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The thing that makes it work so well in your behalf is the way the Bell System is set up to do the job.

No matter whether it is some simple matter of everyday operation—or the great skills necessary to invent the Transistor or develop underseas telephone cables to distant countries—the Bell System has the experience and organization to get it done.

And an attitude and spirit of service that our customers have come to know as a most important part of the Bell System idea.

Bell Telephone System

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or No Accident employes. Available from stock from 1 year thru 25 years. 1 or a 1,000. *Appropriately enameled.*

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Gold Plate	$ .95	$ .92
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10K Gold	4.25	4.00

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LOOK

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necessary; rather there may be a need for improvement in supervision or in other media of communication.

Rule books alone cannot be counted on to have much effect on attitudes or to impart much information. However, they are useful aids in a well-planned persistent accident prevention campaign.

Don't assume that employees will read the manuals from cover to cover without a little outside stimulation. Manuals can, however, add much to the program if their contents are reviewed briefly when presented and during occasional informal quizzes.

Individual cards covering work practices for specific operations sometimes may be used effectively to supplement general material in the manual. * * *

Planning Effective Meetings

FOR UTMOST effect in motivating and supplementing instruction, audio-visual aids should be chosen to fit in with the method of instruction to be used, group to be instructed, and objectives to be achieved.

Audio-visual aids should serve to:

—Formulate correct ideas.
—Create interest.
—Intensify impressions.
—Broaden experience.
—Save learning time.

No matter how good the aid, its effectiveness will be determined largely by the way it is used. Audio-visual aids have the advantage of being easily understood even by poor readers.

It should be remembered that audio-visual aids are not a complete program in themselves. Here are some suggestions for their use:

—The user must know his subject and be thoroughly familiar with the aids.
—Material must be introduced properly. Tell the audience what to expect and its significance.
—Avoid distractions, such as noise, improper focus.
—Don't use too many devices.
—Plan the sequence.
—Try for exact timing and smooth handling.

—Be sure material is pertinent and clearly displayed.

Audio-visual aids may be rented or purchased. Some may be made to order by an outside agency or within the plant. Homemade aids range in price from a few to several thousand dollars.

Following are some of the aids used:

1. Charts—from 8½ x 11 in. to 30 x 40 in.
2. Models, mock-ups, demonstrations.
3. Flannel boards.
4. Movies.
5. Slidefilms.
6. Tape recorders and microphone-equipped dictation machines.

How much did they learn? After a meeting in which any of the above aids are used, see how much the group has learned. This may be done by oral questions, written tests, or performance tests. * * *

Keeping Medical Records

ADEQUATE RECORDS are as important in industrial medical service as in any business enterprise. Incomplete or inaccurate records are almost as useless as none.

"Paper work" shouldn't be too complicated or time-consuming, or it may defeat its purpose. A form which will meet the company's needs can be drawn up by the nurse. It may require revision from time to time to add new items or delete others as dictated by experience or changing circumstances.

Data on pre-employment and periodic health examinations should be included in the medical records. Occupational diseases, and advice or treatment for non-disabling ailments should also be recorded.

Minimum requirements recommended by the American Association of Industrial Physicians and Surgeons are:

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In your plant . . . now . . . do unmarked hazards threaten employees . . . equipment . . . production?

No potential danger is too small to be ignored. STONEHOUSE signs warn of EYE HAZARDS—MACHINE HAZARDS—FIRE DANGER—RADIATION HAZARDS—RESTRICTED AREAS—ELECTRICAL AND FALLING HAZARDS plus scores of others. Signs are made of enduring, tested materials, and designed to meet American Standard specifications.

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Circle Item No. 209—Reader Service Card

Takes the guesswork out of personnel and plant safety

DANGEROUS PROPERTIES
of Industrial Materials

Edited by **N. IRVING SAX**
Consultant on Industrial Safety
Nuclear Development Corp. of America

7" x 10"
1,476 pages
1957
$22.50

Use of this monumental new volume dispels virtually all doubts concerning safe practice in industrial operations. It gives immediate safety information to those who must handle, store or ship chemicals or other industrial materials. This worthy successor to the famous "Handbook of Dangerous Materials" now includes over 8,500 materials, and comprehensively covers the methods involved in the protection of personnel and equipment. "Dangerous Properties" is truly a bible of safety information.

Contents:

ALPHABETICAL LISTING OF OVER 8,500 CHEMICALS AND INDUSTRIAL MATERIALS INCLUDING: Synonym; Description; Formula; Constants; Toxic Hazard Rating; Fire Hazard; Explosion Hazard; Disaster Control; Storage and Handling; Labeling • SHIPPING REGULATION • SYNONYM INDEX

AND COMPREHENSIVE TEXT SECTIONS ON: TOXICOLOGY AND FIRST AID • VENTILATION CONTROL • PERSONNEL PROTECTION AND PERSONAL HYGIENE • ATMOSPHERIC POLLUTION • RADIATION HAZARDS • INDUSTRIAL FIRE PROTECTION • STORAGE AND HANDLING OF HAZARDOUS MATERIALS • REACTOR SAFEGUARDS • ALLERGIC DISEASE IN INDUSTRY

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Please send me a copy of DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS for Free Examination. After 10 days, I will send you $22.50 plus shipping cost or I will return the book and owe nothing.

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SAVE MONEY: Enclose $22.50 with order and Reinhold pays all shipping costs. Same return privilege. Please add 3% sales tax on N.Y.C. orders. DO NOT ENCLOSE CASH!

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Medical Records

1. Personal items (employment data)
   - . . . Name and address
   - . . . Shop number
   - . . . Age
   - . . . Sex
   - . . . Race
   - . . . Marital status
2. Plant items (occupational data)
   - . . . Department
   - . . . Occupation
   - . . . Previous occupation
   - . . . Length of employment
3. Scientific items
   - . . . Date of examination
   - . . . Physical examination classification

In some companies, all employees returning from absences due to physical reasons are cleared through the medical department. Such cases require the following additional data:

- . . . Date of onset of symptoms
- . . . Date of disability
- . . . Diagnosis by attending physician
- . . . Name and address of attending physician

Certification of fitness for work from the attending physician or plant physician may also be required. This may involve physical examination, for which findings and conclusions should be included in the records.

Accident Records

1. Personal items
   - . . . Name and address
   - . . . Shop number
   - . . . Sex
   - . . . Race
   - . . . Marital status
2. Plant items
   - . . . Department
   - . . . Foreman's name
   - . . . Occupation
   - . . . How long employed
   - . . . Physical examination classification
   - . . . Were guards provided and in place? Could they be used?
   - . . . Cause—mechanical or nonmechanical
3. Scientific items
   - . . . Part of body injured
   - . . . Nature and extent of injury
   - . . . Treatment
4. Economic items
   - . . . Amount of production time lost
   - . . . Amount of wages lost
   - . . . Cost of physician, drugs and hospital
   - . . . End results

Record cards for various classifications are similar. In some instances, however, items are added to cover special needs. Confusion will be avoided if various forms are printed on cards of different color.

An *orange* card would show an employee's pre-employment and periodic check-up examinations and visits to dispensary for treatment of nondisabling complaints, with date, complaint, diagnosis and treatment.

A *blue* card might cover absences from work for nonoccupational physical reasons.

A *yellow* card might cover any occupational disease—disabling or nondisabling.

A *white* card would list all disabling and nondisabling accidental injuries.

With these cards, the employee's folder would contain his complete health record, easily analyzed under several important categories.

With such a set of records kept over a year, it would be possible to obtain many types of information. For example, by noting the ages of accident cases, the doctor, nurse or safety director could tell whether older or younger workers suffered more injuries.

CAMERA preserves evidence of happy ending of this man's explosion story.

By running through the cards by departments, it is possible to pick the danger spots in the plant and concentrate on them.

Helpful information about types of injuries could be obtained by this method. The number and severity of infections as revealed by the cards might be reason for pride or an indication of some flaw in first-aid methods.

Number of fractures and periods of disability, number of treatments for complete healing of lacerations could be studied. Many other studies could be made and the findings applied.

Names and addresses should always be recorded. In case an employee should be absent the day after treatment, it may be important to learn whether his absence is the result of the injury. A correct address on the record facilitates investigation. * * *

A Better Break for The Night Shift

NIGHT WORK generally is regarded as a necessary evil by both management and employees. An occasional person may prefer the night shift for personal reasons.

Most workers resent it because it upsets their natural habits of sleeping and eating and because of the disruption of family and social life. The small extra pay for night work does not compensate for its disadvantages.

Rotation of shifts is followed in most companies which operate multiple shifts.

Most employees realize that taking their turn on the night shift is necessary but they feel that management could improve working conditions.

With modern lighting systems, illumination of work places is maintained at the same level day and night for most operations. Food service, first aid facilities and transportation are conspicuous among the difficulties.

Food service. When the full force is not maintained at night, the cost of operating the cafeteria may be excessive. As a result, workers bring their own food, not always a balanced meal, and supplement it with a soft drink from

Circle Item No. 211—Reader Service Card

Circle Item No. 212—Reader Service Card

the vending machine. Unbalanced meals, along with the change of living habits is said to cause a high percentage of digestive troubles among night workers.

Workers in some plants have facilities for making coffee with the company supplying the gas or electric plate. Others have rolling canteens.

Vending machines supply milk and hot beverages and some machines dispense hot foods.

Box lunch services are available at all hours in some localities and neighborhood diners and restaurants send in food and coffee on order.

Medical care. Adequate medical care at night is another problem, especially when a small force is employed. Where night operations are on a large scale, nurses and doctors are often on duty.

Where this is not practicable, first-aid service must be given by trained laymen, frequently the plant guards. Sometimes a doctor visits the plant at night to check the first-aid facilities and give physical examinations.

Transportation. Infrequent bus service at night is a common problem. For many employees car pools are a solution but not all employees can take advantage of them. Often management is able to make some arrangement with the transportation company by guaranteeing a minimum number of riders.

Sometimes it is possible to lay out special routes for buses if a number of workers are living in certain areas. This is appreciated by women on night duty who, with good reason, are afraid to go home alone. When women have to work beyond their regular shift, some companies pay their taxi fare. * * *

Fire Losses Record High in 1957

THE COUNTRY'S fire losses hit a new record high of $1,275,000,000 last year.

Fire deaths in the same period totaled 11,300—an increase of 700 over the 1956 total, but still short of a record.

These are preliminary estimates of the nation's 1957 fire losses as compiled by the National Fire Protection Association.

Corresponding NFPA estimates for the past year in Canada are $135 million loss and 600 deaths.

In 1956 by comparison, the U.S. suffered an estimated $1,231,576,000 property loss and 10,600 fire deaths; Canada, $129,780,000 loss and 601 deaths.

The 1957 U.S. property damage loss of $1,275,000,000 includes $1,050,000,000 loss to buildings and contents and $225 million loss in aircraft, motor vehicles, forest, and other non-building fires. Corresponding figures for the previous year were $1,016,000,000 and $215,576,000.

Approximately 50 per cent of last year's fire deaths—5,650—resulted from home fires according to the fire safety group. Altogether, the NFPA estimated that 6,800 fire deaths occurred in buildings and 4,500 in circum-

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stances other than buildings (cars, airplanes, boats, field fires, etc.).

The worst loss-of-life fire of 1957 occurred when a nursing home in Warrenton, Mo., burned February 17, 1957. There were 72 fatalities.

The year's biggest loss in terms of property damage was a rubber reclaiming factory in Butler, N. J. It was destroyed by fire on February 26, 1957 for a total loss of $12 million.

Third Sanitation Show To Meet in Philadelphia

A greatly expanded approach to problems of industrial and building sanitation is foreseen in the 3rd National Industrial and Building Sanitation Maintenance Show, according to the Institute of Sanitation Management, sponsors of the show.

The 1958 show, produced and managed by Orkin Expositions Management of New York, will take place in Convention Hall in Philadelphia, November 3-6, 1958.

"This show definitely offers a marketing potential still largely untapped by many manufacturers," stated J. Lloyd Barron, director of sanitation for National Biscuit Company, and president of the Institute of Sanitation Management. The Institute came into being in October 1957 through the merger of other groups. Local chapters have become active in New York, Chicago, Washington, D.C., Detroit and Los Angeles.

This will be the show's first appearance in Philadelphia, after previous showings in New York and Chicago. It is designed particularly for the executive who specifies the purchase and/or buys industrial and building sanitation products and equipment.

Because of the latter's expanded responsibility, his interests now include not only corrective maintenance (cleaning equipment, etc.) but also preventive maintenance (structural products and building materials, i.e., paints, floor tiles, ladders).

Ask Information on Research Projects

The Research Information Committee of the American Institute of Industrial Engineers is starting to secure abstracts of research performed in the period July 1, 1952, to July 1, 1957. Information will be solicited from universities, industrial organizations, research institutions, and non-profit organizations, including government agencies and professional societies. The information collecting program will provide a valuable service to industry and universities and especially to industrial engineers.

Research abstracts are to be collected in the areas of: work measurement, methods, plant engineering, human engineering, engineering economics, organization planning, industrial statistics, production control, data processing, operations research, and cost analysis.

The committee will appreciate all information on Industrial Engineering research, about which it might gather more specific details. Write: Research Information Committee, AIIE, Department of Industrial Engineering, Washington University, St. Louis 5, Mo.

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Your employees will know YOU care

- Your company name—trademark—slogan beautifully reproduced on all ball point pens and pencils
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SLIM LINE..

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City .....

☐ Have a representative call.

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INDEX

Twenty-second Annual Safety Equipment Issue

(Titles of sections in bold face)

Abrasive blasting: 106, 110
Absorbents, oil and grease: 130
Acid handling: 146, 150
Air-borne bacteria: 76
Air conditioning for crane cabs: 207
Aisle markers: 74, 124
Alarms, fire: 224
Antiseptics, first-aid: 252
Aprons: 134
Asphyxia hazards: 112
Athlete's foot: 49
Audiometers: 82
Awards and incentives: 260

Belts, industrial safety: 154
  auto seat: 207
Belts and Shafting: 238
Boatswain's chair: 154
Body protection: 134, 146
Breathing apparatus, self-contained: 98
Bridge plates: 191
Brooms: 74
Brushes: 74
Bulletin boards: 261

Cafeterias: 66
Cans, safety: 56
  waste: 74
Canteens: 66
Car movers: 208
Cartridge respirators: 98
Chains: 188
Circuit breakers: 213
Civilian defense: 228
Cleaners, vacuum: 29
Cleansers, skin: 52
  germicidal: 68
  waterless: 68
Clothing, protective: 146
  welders': 149
Coatings, translucent: 166
Cold weather precautions: 243
Color: 20, 30, 32
Combustible gas indicators: 236
Compounds, non-fogging: 96
Construction, fire-resistant: 242
Conveyors: 183
Cranes, portable: 183
Creams, protective: 52, 150
Cups, paper: 64
Cuspidors: 69, 230
Cutting oils: 52
Cyclones: 72

Decals: 264
Deodorants: 76
Detergents: 75
Disinfectants: 76
Dishwashing: 67
Dispensaries, medical: 249
  records: 250
Distribution of equipment: 3
Driers, electric hand: 68
Drinking water: 62
Dust collectors: 71

Ear protectors: 80
Electrical equipment: 152, 205
Electrostatic precipitation: 72
Entrances and exits: 18
Examinations, medical: 248
Exhaust purifiers: 198
Exhaust systems: 71
  purifiers: 198
Extension lamps: 211
Extinguishers, first-aid: 217
Extinguishing systems, fixed: 224
Eye conservation: 92
Eyesight testing equipment: 92

Face shields: 96
Falls: 19
Fans and blowers: 71
Fatigue: 88
Filter lenses: 116
Filters, air: 71
Filter respirators: 98
Fire, brigades: 228
  detection: 224
  doors: 242, 244
  fighting methods: 216
  in metals: 243
First-Aid kits: 250
Flameproofing fabrics: 172
Flammable liquids: 56
Floors, care of: 129
  coatings: 128, 129, 130
  machines: 29
  materials: 19, 24

Circle Item No. 217—Reader Service Card

Food service: 66, 271
Foot protection: 135
  guards: 140, 152
Fountains, drinking: 64
  eye: 49
  wash: 48
Fungus infections: 49
Fuses: 212
Fuse pullers: 212

Gas masks: 96
Germicidal lamps: 132
Goggles: 118
Grating: 26
Grounding, protective:
Guards, machine: 200
  materials for: 201
  photoelectric: 202
  power-transmission:
  pull-back: 201
  sweep: 200
  radioactive: 201
  transparent plastic: 201
  woodworking: 202

Hand creams: 52, 150
Hand leathers: 150
Hands and arms: 76
Harnesses, safety: 154
Head protection: 114, 158
  for women: 116
Hearing aids: 86
  examinations: 82, 86
Heat: 59
Helmets, welding: 116
High-voltage equipment:
Hoists: 183
Hoods: 116
Hose masks: 100
Hot weather hygiene: 59
Housekeeping and Maintenance: 27
Hydrants: 216

Industrial Health Engineering: 47
Inhalators: 254

Janitor's supplies: 74

Ladder shoes: 42
  stabilizers: 42
Ladders, fixed: 26
  crows nest: 41
  light metal: 40
  portable wood: 36
Lamps, filament: 23
  fluorescent: 22
  germicidal: 132
  mercury vapor: 23
Landscaping: 126

Leg protection: 152
Lighting: 20
  emergency: 168
  protective: 18
Linemen's equipment: 152
Lockers: 48, 69
Lubrication, wire rope: 195
Lunchrooms: 66

Machine Operation and Guarding: 199
Maintenance work: 29
Manuals, employee: 266
Masks, canister: 98
  hose: 100
Materials Handling: 179
  manual methods: 181, 197, 198
Mats, floor: 25
Medical and Health Service: 245
Meetings, Safety: 268
Metal fires: 243
Mittens: 150
Models, three dimensional: 17
Mops: 74
Motors: 205
  explosion-proof: 205

Night work: 271
Noise control: 77
Non-fogging compounds: 96

Oil absorbents: 130
Over-current devices: 212

Paint, reflection values: 30
  rust inhibiting: 132
  luminous: 132

SAFETY DIRECTOR

National Service Organization AAA-1, coast-to-coast, headquartered in Atlanta. Age to 40. Must be persuasive speaker with record of achievement in employee safety programs involving automotive equipment, personal safety, and chemicals. Heavy travel — outstanding opportunity, all employee benefits provided. Submit complete resume to Box 437, NATIONAL SAFETY NEWS.

SALES REPRESENTATIVES

New Patented Pneumatic Tourniquet. Hundreds now in use by Industrial and Commercial Safety Depts., Fire, Police Depts., and Ambulance Corps. Can be carried with other lines. Pays high comm. on protected territories. The Sohl Company, 1636 W. Hunting Park Ave., Phila. 40, Penna.

Most Effective
Safety Selling
Because It's Always New!

WAGNER ENDURONAMEL* CHANGEABLE COPY BOARDS

PERMANENT SIGNS CAN'T APPROACH IT.

COPY CHANGED IN MINUTES WITHOUT USING LADDERS.

One of the installations for Commonwealth Edison Co., Chicago, by C. J. Electric Co.

WAGNER SIGN SERVICE, INC.
356 S. Hoyne Avenue Chicago 12, Illinois

Please send free Safety Manual.

NAME
COMPANY
STREET
CITY & STATE

Circle Item No. 218—Reader Service Card

Circle Item No. 219—Reader Service Card

Self-Sticking Safety Signs

Unskilled help quickly puts up Brady Safety Signs—without nails, screws, or tools. They stick and stay stuck to any surface.

The signs you need are among the 500 different Brady Self-Sticking Accident Prevention Signs. Wordings, colors, and sizes are recommended and approved by ASA and NSC. Write for free samples and Catalog 145-D.

Self-Sticking Warning Stripes are applied fast — right off the roll. Stripes in 2 sealed-in plastic colors. Outlast paint. Write for free samples and Bulletin 143-A.

Fast delivery. Distributors in 150 cities.

W. H. Brady Co. 43

780 W. Glendale Ave., Milwaukee 9, Wis.

PREVENT BACK INJURY! *SHOW* THEM HOW TO LIFT THE *RIGHT* WAY

"LIFTY"

Lifting heavy objects the wrong way can cause hernias and severe back injuries. "Lifty," the animated training tool that really puts a point across, dramatically shows your workers just how such injuries are caused by incorrect lifting . . . and shows them how to lift the right way, with the legs instead of the back.

24" high, sturdy wooden construction. 2 models available; clear lacquer or in 3 colors.

TRAINING AIDS
235 Iroquois Road
Hillside, Illinois

Circle Item No. 220—Reader Service Card

Pallets: 182
Parking: 17
Pedestrian traffic: 124
Personal Protection—Part 1: 91
Personal Protection—Part 2: 133
Photoelectric cells: 202
Photography: 260
Piping identification: 32
Plant Layout and Construction: 15, 18
Plant Protection: 215
Plastics: 168
Poison ivy: 255
Posters: 262
Precipitators, electrostatic: 72
Presses, power: 200
Projection equipment: 260
Publications, employee: 266
Purchasing: 3

Radiations, ionizing: 8
Exposure limits: 170
Radioactive guards: 201
materials: 173
Ramps: 26
Records, medical: 269
Respirators, filter: 98
air-line: 100
Rest periods: 67
Rest rooms: 70
Resuscitation: 253
Rope, fiber: 192
wire: 184
Rust prevention: 132

Safety Promotion and Training: 259
Salt: 65
Sanitary equipment and supplies: 29
Saws, circular: 202
Scaffolds: 44
Separators, dynamic: 72
Shields, plastic face: 96
welding: 116
wire mesh: 96
Shoes, safety: 153
conductive: 140
shock-resisting: 140
spark proof: 140
wood sole: 140
Showers: 48
emergency: 49
Signs, safety: 263
reflectorized: 264
Skids: 182
Skin cleansers: 49
Skin infections: 52
Slings, chain: 191
fiber rope: 192
wire rope: 186, 194
Smoking: 74, 230
Snake bite kits: 250, 254
Soap: 49, 75
Soles and heels, slip-resistant: 140
Solvents: 56
Sound absorbers: 79
meters: 78
Spats: 152
Spontaneous ignition: 240
Sprinklers, automatic: 224
Stairs: 25
Static electricity: 234, 237
Steam cleaning units: 74
Storage: 124
Stretchers: 252
Suggestion systems: 262
Sun glasses: 116
Sweatbands: 96
Sweepers, magnetic: 74
power: 74
Sweeping compounds: 131
Switches, electric: 213

Toilets: 69
Tools, hand: 206
press feeding: 201
marking: 208
non-sparking: 209
portable power: 210
Towels: 68
service: 69
Tractors: 182
Transportation, employee: 17, 272
of injured: 252
Trash containers: 74
Trucks, hand: 182, 197
power: 182

Ultraviolet radiation: 76
Urinals: 69

Vacuum cleaners: 29
Vending machines: 66
Ventilation: 50
Vibration: 79
Visual aids: 260
Visual tests: 92, 118

Washrooms: 48
Watchmen: 224, 228
supervisory service: 224
Wax, floor: 129
Weed control: 236
Wetting agents: 230
Wipers, industrial: 76
Wire rope: 184
Wiring: 206
Women in industry: 156
headwear: 116
Wood preservatives: 43

X-ray apparatus and service: 248

SAFETY ENGINEERS

Foreign Employment

Career opportunities for graduate engineers with minimum 5 years practical safety engineering experience in oil operations, heavy industrial or chemical industries. Must know A.P.I. codes and be familiar with hazards peculiar to oil industry. One capable of promoting programs; another to provide staff safety designs and process engineering service for over-all company operations. High salary plus liberal all-inclusive benefits conducive to large savings. Excellent community facilities.

Write outlining personal history and work experience. Please include telephone number.

Recruiting Supervisor, Box 263

ARABIAN AMERICAN OIL COMPANY
505 PARK AVENUE
NEW YORK 22, NEW YORK

WHAT'S NEW IN NATIONAL SAFETY COUNCIL SERVICES *

Operation Safety

The May Operation Safety emphasis—Vehicle Maintenance—offers communities one of the finest opportunities for a successful public participation program during the entire year.

Vehicle Safety-Checks stress accident prevention through proper maintenance and give drivers a chance to "do something" for traffic safety—an opportunity welcomed by more drivers than is often realized.

In addition to the actual safety-checks and the benefits derived from them, these programs give officials and safety councils an excellent opening for a direct public education campaign to a willing and, in a sense, a captive audience.

Periodic vehicle inspection as prescribed by law should be the ultimate goal in all states but public interest and acceptance can be built first by voluntary safety checks.

Recognizing this need and its importance to the safety of the community, business and industrial firms have an opportunity to give their full support to a community safety-check campaign.

Many plants have conducted such checks for their own employees on their own parking grounds. In some cases where an industrial parking lot is available for a large scale safety-check, plants have offered their grounds to the community for such a program.

Business and industry can help support the drive in many other ways—by publicity, by distributing posters and leaflets, and by arranging public exhibits and demonstrations.

©NATIONAL SAFETY COUNCIL

T-1010-C 25" x 38"
T-1011-A 8½" x 11½"

The Vehicle Maintenance program can be an important part of a company's off-the-job safety program and will help the company Back the Attack on Traffic Accidents on still one more front in the nationwide drive to curb traffic accidents.

The National Safety Council has available for the Vehicle Maintenance program two featured posters and a two-color, 3½ by 6" leaflet. In addition, the council has introduced two new posters this month.

One, pointing up the danger of social drinking, shows a traffic court judge saying "Even a *Little* Drinking Dulls Driving Judgment." The other, aimed at young bike riders, shows a boy standing with his bicycle and dreaming of the day when he will drive a car. The copy says "Safe Driving Habits Start Early."

All of these materials are available from National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Nightmare in Korea

Each safety director, engineer and inspector should have the opportunity to spend some time, even if it be for a short while, in this land of non-conformists to accident prevention rules.

If it did nothing else, it would increase his gratitude for guarded machinery, workers who will wear their protective eye-glasses most of the time, drivers who will abide by the codes of the road occasionally and generally all conditions and acts he takes for granted in his respective locale.

Oddly enough, the Korean drivers who work for the U.S. Army and who have been trained at this command consistently attain a lower motor vehicle accident rate than the American military driver. The same is true in the case of the "other" type of accident rate.

Our problem, outside of convincing the American driver that he cannot drive as if he were back home, is to convince the Korean officials that it is mandatory that their civilian drivers, pedestrians, ox-cart operators etc., must be educated so that they realize the traffic problem. Korea has not had motor vehicles in any number for very long, consequently the people can't realize that a vehicle will not stop on a dime nor do they realize that its maneuverability is limited. As a result of this lack of knowledge many of them will not attempt to avoid a vehicle, and oftentimes it appears that they are actually defying the driver.

These are but a few of the problems, but they say the first hundred years are the hardest and the safety man who stays here for very long will attain that mark away ahead of schedule.

—LEONARD J. GRINDLAND, *Safety Director, Pusan Area Command*

* Look to this page each month for latest news about NSC services. Address request for additional information, samples, or prices to the Membership Service Division.

For a More Successful Poster Program

POSTER program aids miniatured on this and the following pages are NEW — shown here for the first time. Those illustrated in one color are actually printed in two or more colors.

Also, be sure to refer to the new 1958 directory section of occupational posters (December 1957 issue, National Safety News) which contains an excellent selection of 756 posters on a greater variety of subjects.

JUMBO POSTER for MAY 1958

The Jumbo poster, issued monthly, is designed for outdoor use and is available to members on annual subscription but is not stocked. Its actual size is 9' 11" by 11' 8".

SAFETY BANNER FOR MAY, 1958

Here is the attention-getting, monthly cloth banner. Available in two types—indoor and outdoor—both are identical in size (10 feet long by 40 inches high), have the same general message and multi-color design. Indoor type is of sturdy drill with grommets for easy hanging, while the outdoor banner is of extra heavy drill, with wind vents, and has strong stitched-in rope for durability.

V-1311-A 8½ x 11½

This new four color poster is illustrative of the 72 four color posters shown in the 1958 Poster Directory.

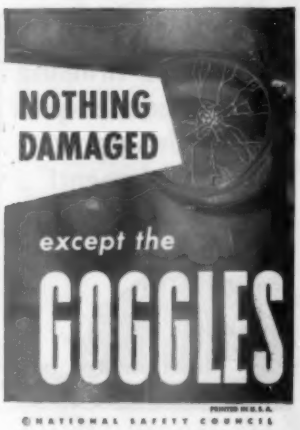
Posters below are printed in two or more colors

(Available only in sizes indicated)

1305-B 17x23

1314-B 17x23

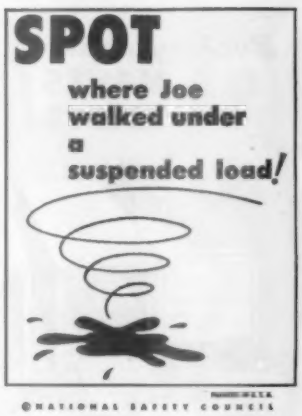
1240-B 17x23



1081-B 17x23

1109-A 8½x11½

1309-A 8½x11½



1177-A 8½x11½

1241-A 8½x11½

1268-A 8½x11½

Electrotypes of payroll inserts can be furnished in all poster illustrations shown above.

Posters below are printed in two or more colors

(Available only in sizes indicated)

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1273-A 8½x11½

©NATIONAL SAFETY COUNCIL

1274-A 8½x11½

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1206-A 8½x11½

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1067-A 8½x11½

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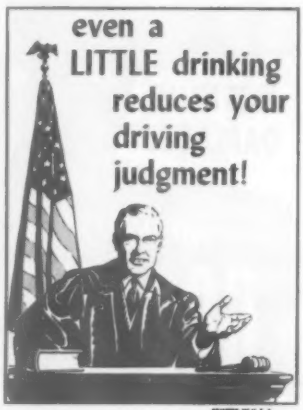
1304-A 8½x11½



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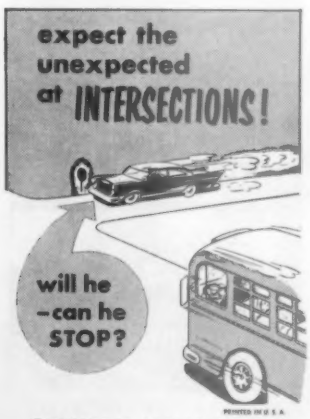
T-1315-C 25x38
T-1316-A 8½x11½



©NATIONAL SAFETY COUNCIL

V-1295-A 8½x11½

©NATIONAL SAFETY COUNCIL

V-1297-A 8½x11½

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V-1296-A 8½x11½

Electrotypes of payroll inserts can be furnished in all poster illustrations shown above.

12

TO THE SAFETY MAN, one of his most important and significant jobs is the selection of equipment for safeguarding his workers. But—he can't do this job properly and avoid wasted time and effort without a complete, easy-to-use and up-to-date reference on what to buy and where to get it.

The "Directory of Safety Equipment Sources" and the "Classified Safety Product Index" are tailor-made tools that provide the information immediately. Just look up the product in the Classified Index — there are over 600 categories from Abrasives to Wrenches —and pick any or all of the sources. You'll find the company name and address—along with distributors, branch offices, and representatives — in the Sources Directory.

In addition, there are complete descriptions of many of the products in the advertising pages of this issue. Advertising page numbers are listed by the boldface company listings and in the Advertisers' Index.

IN SECTION 12:

Directory of Safety Equipment Sources 282

Classified Safety Product Index 316

Index to Advertisers 334

PRODUCT and SOURCE DIRECTORIES

directory of safety equipment sources

—A—

Acme Protection Equip. Co. 129
1209 Kalamazoo St., South Haven, Mich.

DISTRIBUTORS:

Harless, L. P., Co. Ltd., 2627 Seventh Ave. S., Birmingham, Ala.
Industrial Safety Supply Co., 1727 Huntsville Rd., Birmingham, Ala.
Fire Appliance & Safety Co., 1114 W. Markham, Little Rock, Ark.
Brenton Equipment Co., 374 Brannan St., San Francisco, Calif.
Guardian Safety Equipment Co., 7223 S. Main St., Los Angeles, Calif.
Safety Equipment Co. of Florida, 9505 Florida Ave., Tampa, Fla.
Guardian Safety Equipment Co., 1091 Euclid Ave., N.E., Atlanta, Ga.
Universal Safety Equipment Co., 5115 W. Diversey Ave., Chicago, Ill.
Standard Industrial Products Co., 920 N. Garfield Ave., Peoria, Ill.
Williams & Co. Inc., 1109 S. Preston St., Louisville, Ky.
Guardian Safety Equipment Co., 3615 Capitol Hts. Ave., Baton Rouge, La.
General Equipment Corporation, 261 Franklin St., Boston, Mass.
Averill Equipment Co., 19235 Conant Ave., Detroit, Mich.
Continental Safety Equipment Inc., 1551 Selby Ave., St. Paul, Minn.
Safety Incorporated, 17 E. 31st St., Kansas City, Mo.
Safety Incorporated, 2608 Olive St., St. Louis, Mo.
Big Horn Supply Co., Inc., P.O. Box 1493, Billings, Mont.
Guardian Safety Equipment Co., 400 S. Jefferson St., Orange, N. J.
New Jersey Safety Equipment Co., 299 Park Ave., East Orange, N. J.
The Watson Company, 1443 Main St., Buffalo, N. Y.
Acme Safety Products Co., 387 Storer Ave., Akron, Ohio
Williams & Co., Inc., 3231 Fredonia Ave., Cincinnati, Ohio
Williams & Co., Inc., 3700 Perkins Ave., Cleveland, Ohio
Williams & Co., Inc., 960 Williams Ave., Columbus, Ohio
Williams & Co., Inc., 946 Kane St., Toledo, Ohio
Guardian Safety Equipment Co., 1742 S. Main St., Tulsa, Okla.
Munnell & Sherrill, Inc., 1163 N.E. 63rd Ave., Portland, Ore.
Sanderson Safety Supply Co., 816 S.E. Hawthorne Blvd., Portland, Ore.
Guardian Safety Equipment Co., 214-216 S. 45th St., Philadelphia, Pa.
Industrial Products Company, 2830 N. Fourth St., Philadelphia, Pa.
Williams & Co. Inc., 901 Pennsylvania Ave., Pittsburgh, Pa.
Federal Laboratories, Inc., Box H, Saltsburg, Pa.
Safety Equipment Distributing Co., 832 W. Main Ave., Knoxville, Tenn.
Guardian Safety Equipment Co., 2570 Flaxley Dr., Dallas, Tex.
Guardian Safety Equipment Co., 200 Sandman St., Houston, Tex.
Universal Safety & Fire Equi. Inc., 727 S.W. Temple, Salt Lake City, Utah
Richmond Tire & Rubber Co. Inc., 7th & Leigh Sts., Richmond, Va.
Safety & Supply Co., 115 Blanchard St., Seattle, Wash.
Universal Safety Equipment Co., 3155 S. 7th St., Milwaukee, Wisc.
Bell Electricord & Safety Equip. Co., 11 Watkinson Ave., Toronto, Ont. Can.
Butler Optical Co. Ltd., 1520 Mountain St., Montreal, Que., Can.
Fleck Bros. Ltd., 110 Alexander St., Vancouver, B. C., Canada
Gaspro Ltd., P. O. Box 2454, Honolulu, T. H.
Equipos de Seguridad, S. A. Sullivan No. 95, Mexico, D. F., Mexico

Acoustical Engineering Corp. 81
138 Mellie Esperson Bldg., P. O. Box 1735, Houston 2, Texas

Adair, Robin W. 174
P. O. Box 248, Avoca, N. Y.

Advance Floor Machine Co.
4100 Washington Ave. North,
Minneapolis 12, Minn.

DISTRIBUTORS:

Certified Prod. Co., 2300 1st Ave. So., Birmingham, Ala.
McKesson Robbins, 453 St. Anthony St., Mobile, Ala.
McGlynn Paper Co., 2276 W. Fairview Ave., Montgomery, Ala.
Druid Supply Co., Highway 11, P. O. Box 706, Tuscaloosa, Ala.
Arizona Disinfectant Co., 223 E. Madison, Phoenix, Ariz.
Sanitary Supply Co., 536 E. Ninth St., Tucson, Ariz.
Little Rock Paper Co., 1022 E. Capital, Little Rock, Ark.
Hudson Supply Co., 1414 24th St., Bakersfield, Calif.
San Joaquin Paper & Janitor Supply Co., 459 Van Ness Ave., Fresno, Calif.
Long Beach Janitor Supply Co., 222 E. Anaheim Ave., Long Beach, Calif.
Easterday Supply Co., 1150 W. 4th St., Los Angeles, Calif.
Empire Chemical Co., 715 Lamar St., Los Angeles, Calif.
Hollywood Houseman Supply Co., 2798 Sunset Blvd., Los Angeles, Calif.
Magic Chemical Co., 2291 Athens Ave., Redding, Calif.
Ty Sidener Co., 2114 K St., Sacramento, Calif.
Kleen-Line Corp., 2050 S. Main St., Santa Ana, Calif.
Kleen-Line Corp., 141 S. E. St., San Bernardino, Calif.
Easterday Supply Co., Fell & Gough Sts., San Francisco, Calif.
American Sanitary Prod. Co., 1514 Arapahoe St., Denver, Colo.
Auburn Chemical Co., 643 Main St., Middletown, Conn.
Superior Sanitary Supply Co., 306 Shipley St., Wilmington, Del.
Lawton Brothers, 11 Florida Ave., Jacksonville, Fla.
Lien Chemical Co., 2727 N. W. 79th St., Miami, Fla.
Lawton Brothers, 2311 N. Orange Ave., Orlando, Fla.
Mid-Fla Chemical Co., 1010 St. Michael St., Tallahassee, Fla.
Lenfesty Supply Co., Box 3276, Twiggs & Meridian, Tampa, Fla.
Puritan Chemical Co., 916-32 Ashby St., N. W., Atlanta, Ga.
Lien Chemical Co., 9229 W. Grand Ave., Franklin Park, Ill.
Riddiford Bros., Inc., 308 W. Randolph St., Chicago, Ill.
Turner Products Co., 1059 N. Liberty St., Elgin, Ill.
Lien Chemical Co., 1642 Warehouse Rd., Rockford, Ill.
Maintenance Supply Co., 1613 15th E. Jefferson St., Springfield, Ill.
Moellering Supply Co., 105 E. Columbia, Ft. Wayne, Ind.
Moellering Supply Co., 109-75 E. Marion St., Elkhart, Ind.
Pro-Tex-All Co., 223 N. W. Second St., Evansville, Ind.
Globe Industrial Supplies, 546 W. Washington St., Indianapolis, Ind.
General Supply Co., 219-221 W. Main St., Muncie, Ind.
Lien Chemical Co., 2828 S. Main St., South Bend, Ind.
Lee's School Supply, 119 S. 3rd St., Terre Haute, Ind.
Capital Sanitary Supply Co., 111-11th St., Des Moines, Iowa
Midland Laboratories, 210 Jones St., Dubuque, Iowa
Harris Janitor Supply Co., P. O. Box 1437, 820 Pearl St., Sioux City, Iowa
Pur-O-Zone Chemical Co., Box 237, Lawrence, Kans.
Louisville Chemical Co., 601 E. Jefferson, Louisville, Ky.
Bancroft Paper Co.:
1106 Choctaw St., Baton Rouge, La.
P. O. Box 2925, Monroe, La.
1017 Calliope, New Orleans, La.
308 Strand, Shreveport, La.
Fitch Dustdown Co., 801 S. Howard, Baltimore, Md.
Merit Paper & Chemical, 57 Regent St., Cambridge, Mass.
Wilcox, Robert A., Co., 22 Bedford St., Fall River, Mass.
Frank Bros. Paper Co., 56 Hampden St., Springfield, Mass.
Bockstanz Brothers, 1205 Beaufait Ave., Detroit, Mich.
Gast, P. E., & Sons, 1515 Madison St., Grand Rapids, Mich.
Myers, R. A., Co., 1585 Marshall, St. Paul, Minn.
Pond, C. M., & Sons, 340 Highway No. 7, Excelsior, Minn.
Jackson Paper Co., Drawer 3007, W. Jackson Sta., Jackson, Miss.
Newell Paper Co., P. O. Box 2069, Meridan, Miss.
Bancroft Paper Co., Brenham Ave., Natchez, Miss.
White Castle Janitor Supply Co., 458 S. Robberson, Springfield, Mo.
Consolidated Chemical Labs., Inc., 1470 S. Vandeventer Ave., St. Louis, Mo.
Pro Chemical Co., 5156 Delmar, St. Louis, Mo.
Puritan Chemical Co., 1605 Tower Grove Ave., St. Louis, Mo.
K-B Chemical Co., P. O. Box 1035, Billings, Mont.
O. B. Lund Co., 301 W. First St., Havre, Mont.
Kelso Chemical Co., 117 N. Ninth St., Lincoln, Neb.
Clan Mfg. Co., 310 Market St., Camden, New Jersey
Ford Distributors, 60 Robbinwood Terrace, Linden, N. J.
Hale Sanitary Supply Co., 1401-1413 12th St. N.W., Albuquerque, N. M.
Crandall Supply Co., 77 State St., Binghampton, N. Y.
Hubbs & Howe Co., 2200 Harlem Rd., Buffalo, N. Y.
Tri State Sanitation, 100 Perry St., Buffalo, N. Y.
Janvey, L., & Sons, 215 S. Front St., Hempstead, L. I., New York
Creco Co., Inc., 36-06 43rd Ave., Long Island City, N. Y.
Buck, L. H., Co., Inc., 210 Oak St., Plattsburg, N. Y.
Roberts-Boice Paper Co., 40 Cottage St., Poughkeepsie, N. Y.
Lenahan Sales Co., 62 Ford St., Rochester, N. Y.
Bee Maintenance Supply Co., 1500 Crane St., Schenectady, N. Y.
Moore, Wm. B., Co., 621 S. West St., Syracuse, N. Y.
Rohner Co., 763-75 S. High St., Akron, Ohio
Continental Chemical Co., 2750 Grand Ave., Cleveland, Ohio
Lincoln American Cleaning Equip. Co., 2032 W. Schaaf Rd., Cleveland, Ohio
Thompson's Supply Co., Sixth & Patterson Blvd., Dayton, Ohio
Powell Co., Inc., 221-223 S. Main St., Lima, Ohio
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Gebier Supply Co., P. O. Box 739, Binghamton, N. Y.
Elwood Corp., 2180 Elmwood Ave. at Hinman, Buffalo, N. Y.
Auster Rubber Co., 25 Manhattan Ave., Brooklyn, N. Y.
Rubber Products Co., Inc., 3003 E. Bessemer Ave., Greensboro, N. C.
Eastern Electric Supply Co., Inc., P. O. Box 352, Rocky Mt., N. C.
Williams & Co., Inc., 3231 Fredonia Ave., Cincinnati, Ohio.
Williams & Co., Inc., 3700 Perkins Ave., Cleveland, Ohio.
Williams & Co., Inc., 851 Williams Ave., Columbus, Ohio.
Fyr-Fyter Co., 221 Crane St., Dayton, Ohio.
Cleveland Welder's Supply, 1443 Hamilton Ave., Cleveland, Ohio.
Karl Kuemmerling Inc., P. O. Box 248, Canton, Ohio.
Perry Sales Engineering, 1327 S. Winston, Tulsa, Okla.
Munnell & Sherrill Inc., P. O. Box 4987, Portland, Ore.
General Scientific Equip. Co., 7516 Limekiln Pike, P. O. Box 3038, Philadelphia, Pa.
Guardian Safety Equip. Co., 214 S. 45th St., Philadelphia, Pa.
Williams & Co., Inc., 901 Pennsylvania Ave., Pittsburgh, Pa.
Clement Safety Equip. Inc., 720 S. 3rd St., Memphis, Tenn.
Tennessee Valley Elec. Supply Co., P. O. Box 1133, Nashville, Tenn.
Smalling & Co., 604 Demonbreun St., Nashville, Tenn.
Cummins Supply Co., 513 North Arthur, Box 124, Amarillo, Tex.
Sterett Supply Co., P. O. Box 5128, Corpus Christi, Tex.
Southwest Equip. & Extinguisher Co., 526 Palm Dr., Corpus Christi, Tex.
Kelley's Safety Supply Co., 2602 Grape St., Abilene, Tex.
Hilton Fire & Safety Service Co., 1422 Overton Rd., Dallas, Tex.
Nelson Electric Supply Co., 1123 Slocum St., Dallas, Tex.
Settle Safety Supply, 5495 Swiss Ave., P. O. Box 9826, Dallas, Tex.
Settle Safety Supply, 307 North Amburgey St., Odessa, Tex.
Allied Safety Equipment Inc., 361-62 M & M Bldg., Houston, Tex.
Hughes, David L., Co., 7002 Navigation, Houston, Tex.
Warner, S. D., Box 10306, Station 21, San Antonio, Tex.
Richmond Rubber Co., 7th & Leigh Sts., Richmond, Va.
Best, Ken H., 541 First Ave. S., Seattle, Wash.
Safety Equip. Engineering, 1059 Elmore St., Green Bay, Wis.
Kennedy-Ingalls Co., 3735 W. 35th St., Milwaukee, Wis.
Canwest Safety Service Supply Ltd., 135 - 3rd Ave. E., Calgary, Alberta, Canada.
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3865 N. Milwaukee Ave., Chicago 41, Ill.

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Wehle Electric, 473-475 Ellicott St., Buffalo, N. Y.
Wehle Electric, 304 Andrews, Rochester, N. Y.
Lawrence, F. D., Electric Co., 217 W. 4th St., Cincinnati, Ohio.
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McKeever Electric Co., 212 W. Grant Ave., Columbus, Ohio.
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Peterson Co., 4040 Colorado Blvd., Denver, Colo.
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Barton, Jas. B., Jr., Co., 3135 Liddell Dr., N.E., Atlanta, Ga.
Steel Sash Service, Inc., 2141 Lawrence Ave., Chicago, Ill.
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Holliday, W. J., & Co., 545 McCarty St., Indianapolis, Ind.
Fabricated Steel Prod., 2035 South Main St., South Bend, Ind.
Electrical Engineering & Equip. Co., 1201 Walnut St., Des Moines, Iowa
Mult-A-Frame Co. of Wichita, 1610 E. Harry St., Wichita, Kans.
Todd Denigan Co., 811 W. Main St., Louisville, Ky.
Power-Strut Southern Service Co., 820 Julia St., New Orleans, La.
Power Prod. Co., 11 Clafin St., Framingham, Mass.
Ross, Paul, Inc., 14000 Linwood Ave., Detroit, Mich.
Plant Equip. Service Co., 525 Monroe Ave., N. W., Grand Rapids, Mich.
Skarnes Engineering & Supply Co., 2907 E. Franklin, Minneapolis, Minn.
Power-Strut Southern Service Co., 422 S. West, Jackson, Miss.
Unistrut Dist. Corp., 5018 Main St., Kansas City, Mo.
Thomas, Inc., 114 S. Bemiston, St. Louis, Mo.
Construction Materials Co., 324 S. Montana, Butte, Mont.
White, Wm. R., Co., 1614 Chicago St., Omaha, Neb.

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Carter, Oral T., & Associates, 1704 Dreman Ave., Cincinnati, Ohio
Morrison Co., 4119 Prospect Ave., Cleveland, Ohio
Loeb Electric Co., 915 Williams Ave., Columbus, Ohio
Willyard Co., Inc., 722 Ontario, Toledo, Ohio
King Metal Products, 28 N. Guthrie, Tulsa, Okla.
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Hunt, J. A., Co., 3513 Lancaster Ave., Philadelphia, Pa.
Gateway Metal Specialties, 1280 Ridge Ave., Pittsburgh, Pa.
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Power-Strut Southern Service Co., 2523 Broad St., Memphis, Tenn.
Southeastern, Inc., 207 12th Ave., S. Nashville, Tenn.
Ward, L. B., Steel Prod. Co., 3009 Canton St., Dallas, Tex.
Ward, L. B., Steel Prod. Co., 1814 Texas Ave., Houston Tex.
Steel Engineers Corp., 1526 S. W. Temple St., Salt Lake City, Utah
Richmond Steel Co., 18th & Byrd Sts., Richmond, Va.
Cascade Distributors, 1918 First Ave., South, Seattle, Wash.
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Roberston-Irwin, Ltd., 411 Parkdale Ave., N., Hamilton, Ont., Can.
Robertsteel (Canada Ltd.), 5350 Ferrier St., Montreal, Que., Can.

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417 S. Route AIA, Stuart, Fla.
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2050 N. Hawthorn, Melrose Park, Ill.
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220 Milk St., Boston, Mass.
6470 E. Jefferson, Detroit, Mich.
2482 University Ave., St. Paul, Minn.
2201 Truman Rd., Kansas City, Mo.
5 White St., New York N. Y.
526 Scalybark Rd., Charlotte, N. C.
1111 N. W. 16th St., Portland, Ore.
5 S. 36th St., Philadelphia, Pa.
3501 Bigelow Blvd., Pittsburg, Pa.
3550 W. 12th St., Houston, Tex.
531 S. 2nd West, Salt Lake City, Utah
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615 Seventh St., Sacramento 14, Calif.
625 Broadway, San Diego 1, Calif.
601 Brannan St., Cor. Fifth, San Francisco 7, Calif.
2175 15th St., Denver 2, Colo.
669 New Park Ave., Hartford (West) 10, Conn.
Knowles at Welbourne, Winter Park, Fla.
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4425 S. Western Ave., Chicago 9, Ill.
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2402 W. Fayette St., Baltimore 23, Md.
131 State St., Boston 9, Mass.
2639 Cadillac Tower, Detroit 26, Mich.
623 Washington Ave., South, Minneapolis 15, Minn.
2316 Burlington Ave., Kansas City (North) 16, Mo.
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100 State St., Albany 7, N. Y.
1374 Clinton St., Buffalo 6, N. Y.
400 Park Ave., New York 22, N. Y.
1673 Clinton Ave., North, Rochester 21, N. Y.
1431 W. Morehead St., Charlotte 8, N. C.
3253 Fredonia Ave., Cincinnati 23, Ohio
1294-96 E. 55th St., Cleveland 3, Ohio
150 E. Broad St., Columbus 15, Ohio
2240 Northwest 29th Ave., Portland 10, Ore.
Erie Ave., & D. St., Philadelphia 34, Pa.
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Collier, T. A., 1123 Western Savings Fund Bldg., Philadelphia, Pa.
Wollett, J. W., 24 Sunnyfield Dr., R. D. 2, Bridgeville, Pittsburgh, Pa.
Black, Hugh, P. O. Box 815, Greenville, S. C.
Hough, A. R., P. O. Box 1452, Knoxville 39, Tenn.
Kemp, Charles J., P. O. Box 13251, Dallas 39, Tex.
Mayo, D. S., Co., 4101 San Jacinto, Houston 4, Tex.
Pease, Fred A., P. O. Box 1766, Salt Lake City 12, Utah
Mercer, Harold H., & Son, P. O. Box 24, Wauwatosa 13, Milwaukee, Wis.
Torman Co., 704 E. Pleasant Ave., Milwaukee 2, Wis.
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148 E. Third Ave., Vancouver 10, B. C., Can.
Permafiex Industries, Ltd., 2710 St. Clair Ave., West, Toronto, Ont., Can.

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1217 W. Washington Blvd., Chicago 7, Ill.

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250 E. 43rd St., New York 17, N. Y.

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49 Wall St., Passaic, N. J.

Holcomb Safety Garment Co. 165
128 N. Jefferson St., Chicago 6, Ill.

Holt Mfg. Co. 32
669 20th St., Oakland 12, Calif.

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Hood Rubber Co. 158
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Hornik, Frederick
309 Fifth Ave., New York 16, N. Y.

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303 W. Lehigh Ave., Philadelphia 33, Pa.

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684 Broadway, New York 12, N. Y.

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Guardian Safety Equip. Co., 1091 Euclid Ave., N. E., Atlanta, Ga.
Freeman, J., 1316 E. 63rd St., Chicago, Ill.
Iowa Safety Equip. Co., 414 12th St., Des Moines, Iowa
Safety Shoes, Inc., 556 N. Parkview Pl., Baton Rouge, La.
Erickson Safety Shoe Co., 18474 Vaughan, Detroit, Mich.
Northern States Safety Equip. Co., 6438 17th Ave. South, Minneapolis, Minn.
Sid Boedeker Mobile Unit, 6924 Florian Ave., Normandy, Mo.
Industrial Safety Service, Inc., 5 South Vandeventer, St. Louis, Mo.
Pennsylvania Safety Shoe Co., 212 Main St., Jamestown, N. Y.
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Webb's Industrial Plant Service, 4217 Smith Rd., Norwood, Ohio
Industrial Safety Service, Inc., 619 Kenilworth Dr., Pittsburgh, Pa.
Safety Shoes, Inc., 218 Sedgwood Rd., Springfield, Pa.
Central Commissary Co., 1517 Gano St., Dallas, Texas
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Los Angeles 25, Calif.

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700 Garfield St., Danville, Ill.

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2850 N. Fourth St., Philadelphia 33, Pa.

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3020 Snelling Ave., Minneapolis 4, Minn.
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899 Frelinghuysen Ave., Newark 12, N. J.
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Karel First Aid Supply Co.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Scientific Industrial Supply Co.
Seco Safety Products Co.
Singer Glove Mfg. Co.
Standard Glove Co.
Standard Safety Equipment Co.
Wheeler Protective Apparel, Inc.

Blast Furnace Equipment

Bailey, William M. Co.
Kimball Safety Prod. Co.

Blockers, Mine Car

Mine Safety Appliances Co.
Safety First Supply Co.

Blockers, Railroad Car

Calumet Steel Casting Corp.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

Blowers, Hose Mask

Acme Protection Equip. Co.
Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
United States Hoffman Machinery Corp.

Blowers, Portable, Electric

Buffalo Forge Co.
Coppus Engineering Corp.
Doyle Vacuum Cleaner Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Multi-Clean Prod., Inc.
United States Hoffman Machinery Corp.

Blowers, Ventilating

Buffalo Forge Co.
Coppus Engineering Corp.
Day Co., The
Engineering Corp. of America
McDonald, B. F., Co.
Morrison Products, Inc.
United States Hoffman Machinery Corp.
Westinghouse Electric Corp.

Boards, Changeable Letter

Boyer-Campbell Co.
General Scientific Equip. Co.
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
Prairie State Prod. Co.
Ready Made Sign Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Sohl Company

Books on Safety

Bullard, E. D., Co.
Loss Control Associates
National Safety Council
Reinhold Publishing Co.

Boot Liners

Miller Equip. Co., Inc.

Boots, Linemen's

Advance Glove Mfg. Co.
Bashlin, W. M., Co.
Bone Dry Shoe Mfg. Co.
Dorsey, John E., Co.
Dunn Products
Goodall Rubber Co.
Hy-Test Safety Shoes Div.,
International Shoe Co.
Lehigh Safety Shoe Co.
Midwest Glove Co., Inc.
Olympic Glove Co., Inc.
Rochester Safety Equip. Co., Inc.
Salisbury, W. H., & Co.
Standard Glove Co.

Boots, Neoprene

Tingley Rubber Corp.

Boots, Rubber

Advance Glove Mfg. Co.
Dorsey, John E., Co.
Dunn Products
Goodall Rubber Co.
Iron Age Safety Shoe Div.,
H. Childs & Co., Inc.
Lehigh Safety Shoe Co.
Midwest Glove Co., Inc.
Olympic Glove Co., Inc.
Plasco Safety Prod. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Scientific Industrial Supply Co.
Searjeant Metal Products, Inc.
Snyder, M. L., & Son, Inc.
Standard Glove Co.
Tingley Rubber Corp.
United States Rubber Co.

Boots, Safety Toe

Advance Glove Mfg. Co.
Bone Dry Shoe Mfg. Co.
Dunn Products
Goodall Rubber Co.
Hy-Test Safety Shoes Div.,
International Shoe Co.
Iron Age Safety Shoe Div.,
H. Childs & Co., Inc.
Lehigh Safety Shoe Co.
McAn, Thom, Safety Shoe Div.
Midwest Glove Co., Inc.
Olympic Glove Co., Inc.
Pulmosan Safety Equip. Corp.
Reece Wooden Sole Shoe Co.
Rochester Safety Equip. Co., Inc.
Scientific Industrial Supply Co.
Snyder, M. L., & Son, Inc.
Standard Glove Co.

Boots, Wooden Sole

McDonald, B. F., Co.
Midwest Glove Co., Inc.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Reece Wooden Sole Shoe Co.
Rochester Safety Equip. Co., Inc.
Scientific Industrial Supply Co.
Standard Glove Co.
Standard Safety Equipment Co.

See directory of Safety Equipment Sources for addresses.

Bottle Carrier
Fisher Scientific Co.
Fyrepel Prod. Inc.
General Scientific Equip. Co.
Kennedy-Ingalls, Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

Bottle Crushers
Laduby (Flur-o-lock) Co., Inc.

Breathing Apparatus, Air Supplied
Acme Protection Equip. Co.
Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
Fibre-Metal Prod. Co.
Fisher Scientific Co.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Scott Aviation Corp.

Buckets, Elevator
Link-Belt Co.

Buckets, Hoisting
Buhrke, R. H., Co.
Industrial Prod. Co.
Ré-Mar Prods. Corp.
Witt Cornice Co.

Buckets, Rubber
Dunn Products
Fisher Scientific Co.
General Scientific Equip. Co.
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Snyder, M. L., & Son, Inc.

Bulletin Boards
Boyer-Campbell Co.
Davenport, A. C., & Son, Inc.
Elliott Service Co., Inc.
General Scientific Equip. Co.
Industrial Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Appliances Co.
Pulmosan Safety Equip. Corp.
Ready Made Sign Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Scientific Industrial Supply Co.
Searjeants Metal Products, Inc.
Seco Safety Products Co.
Sohl Company
Standard Glove Co.
Standard Safety Equipment Co.

Burn Ointments, Sprays
Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
General Scientific Equip. Co.
Halperin, A. E., Co., Inc.
Interstate Precision Products Corp.
Malton Chemical Corp.
Div. of Doho Chemical Corp.
McDonald, B. F., Co.
Medical Supply Co.
Mine Safety Appliances Co.
Pac-Kit Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

Burners, Gas
Coppus Engineering Corp.
Fisher Scientific Co.

C

Cabinets, Towel
Karel First Aid Supply Co.
Rochester Safety Equip. Co., Inc.
Scott Paper Co
West Chemical Products, Inc.

Cable Clamps
American Hoist & Derrick Co.
Bethlehem Steel Co.
Canton Mfg. Co.
Jackson Products
Newco Mfg. Co., Inc.

Cable Clamps—Sealing Grips
Pyle-National Co.

Cable Connector
Fibre-Metal Prod. Co.
Jackson Products
Pyle-National Co.

Cable Cutters
Montgomery & Co., Inc.

Cable Pullers
Petersen Engineering Co., Inc.

Cable Tester
Hewson Co., Inc.
Mine Safety Appliances Co.

Cable Wire
Bethlehem Steel Co.
Jones & Laughlin Steel Corp.
Macwhyte Co.
Roebling's, John A., Sons Corp.

Cans, Safety
Continental Can Co.
Eagle Mfg. Co.
Fisher Scientific Co.
General Scientific Equip. Co.
Justrite Mfg. Co.
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
Protectoseal Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Scientific Industrial Supply Co.
Searjeant Metal Products, Inc.
Seco Safety Products Co.
Snyder, M. L., & Son, Inc.
Witt Cornice Co.

Canvas, Fireproofed
Advance Glove Mfg. Co.
Aljay Mfg. Co., Inc.
Associated Bag & Apron Co.
Boyer-Campbell Co.
Dunn Products
Frommelt Industries
General Scientific Equip. Co.
Holcomb Safety Garment Co.
Industrial Prod. Co.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Midwest Glove Co., Inc.
Pulmosan Safety Equip. Corp.
Racine Glove Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Scientific Industrial Supply Co.
Searjeant Metal Products, Inc.
Seco Safety Products Co.
Singer Glove Mfg. Co.
Smith, A., & Son, Inc.
Standard Glove Co.
Wheeler Protective Apparel, Inc.

Caps for Women
Advance Glove Mfg. Co.
Associated Bag & Apron Co.
Boyer-Campbell Co.
General Scientific Equip. Co.
Industrial Prod. Co.
Kennedy-Ingalls, Inc.
McDonald, B. F., Co.
Milburn Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Scientific Industrial Supply Co.
Searjeant Metal Products, Inc.
Standard Glove Co.
Standard Safety Equipment Co.
Thompson Cap Co.
Wheeler Protective Apparel, Inc.

Car Door Opener
General Scientific Equip. Co.
Industrial Prod. Co.
Link-Belt Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

Car, Hopper Closer
General Scientific Equip. Co.
Industrial Prod. Co.
New Jersey Safety Equip. Co.
Safety First Supply Co.

Car Spotters
Link-Belt Co.

Carboy Drainer
Fisher Scientific Co.
General Scientific Equip. Co.
Industrial Prod. Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Standard Safety Equipment Co.

Carboys, Plastic
Fisher Scientific Co.
General Scientific Equip. Co.
Karel First Aid Supply Co.
New Jersey Safety Equip. Co.
Plax Corp.
Pulmosan Safety Equip. Corp.

Carboy Tilter
Fisher Scientific Co.
General Scientific Equip. Co.
Industrial Prod. Co.
Morse Mfg. Co., Inc.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Standard Safety Equipment Co.
West Bend Equip. Corp.

Carboy Truck
Fisher Scientific Co.
General Scientific Equip. Co.
Industrial Prod. Co.
Morse Mfg. Co., Inc.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
West Bend Equip. Corp.

Carriers, Drum and Barrel
Continental Can Co.
General Scientific Equip. Co.
Industrial Prod. Co.
Jones & Laughlin Steel Corp.
Merrill Brothers, Inc.
Morse Mfg. Co., Inc.
New Jersey Safety Equip. Co.
Plax Corp.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Searjeant Metal Products, Inc.
West Bend Equip. Corp.

Carriers, Food
Dixie Cup Div. American Can Co.
Karel First Aid Supply Co.
Vacuum Can Co.

Carriers for Cylinders
Fisher Scientific Co.
Karel First Aid Supply Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

Carton Openers
Flash Mfg. Co.

Cases, Spectacle, Goggle & Sun Glasses
Opticase Co.

Chain
Columbus McKinnon Chain Corp.
Jones & Laughlin Steel Corp.
Link-Belt Co.
Taylor, S. G., Chain Co., Inc.

Chain, Coil
American Chain Div.,
American Chain & Cable Co., Inc.
Canton Mfg. Co.
Columbus McKinnon Chain Corp.
Taylor, S. G., Chain Co., Inc.

Chain, Spark Resisting
Ampco Metal, Inc.
Taylor, S. G., Chain Co., Inc.

Chains, Magnet
American Chain Div.,
American Chain & Cable Co., Inc.
Columbus McKinnon Chain Corp.
Taylor, S. G., Chain Co., Inc.

Chains, Sling
American Chain Div.,
American Chain & Cable Co., Inc.
Columbus McKinnon Chain Corp.
Taylor, S. G., Chain Co., Inc.
Wickwire-Spencer Steel Div.
Colorado Fuel & Iron Corp.

Chairs, Safety Boatswain
Bashlin, W. M., Co.
Buhrke, R. H., Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Safety First Supply Co.

Chisel Grip
General Scientific Equip. Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Rose Mfg. Co.
Safety First Supply Co.
Standard Glove Co.
Standard Safety Equipment Co.
Tameo, Inc.
Tool & Mfg. Co., Inc.

Chocks, Wheel
Aldon Company
Calumet Steel Castings Corp.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.

Clamps
Custanite Corp.
Kensico Mfg. Co., Inc.
Merrill Brothers, Inc.
Renfroe, J. C., & Sons, Inc.

Clamps, Rail
Industrial Prod. Co.
New Jersey Safety Equip. Co.
Prairie State Prod. Co.
Safety First Supply Co.
Standard Safety Equipment Co.

Clamps, Sockets and Eyebolts
American Hoist & Derrick Co.

Clamps, Wire Rope
American Chain & Cable Co., Inc.
American Hoist & Derrick Co.
Bashlin, W. M., Co.
Broderick & Bascom Rope Co.
Jones & Laughlin Steel Corp.
Lowery Brothers, Inc.
Macwhyte Co.
Newco Mfg. Co., Inc.
New Jersey Safety Equip. Co.

Clamps, Wood
Charleston Rubber Co.

Cleaning Compounds or Solvents
American Optical Co.
Associated Just Distributors, Inc.

To locate Advertisements, see Advertisers' Index.

Brulin & Co., Inc.
Curran Corp.
Dameron Enterprises, Inc.
Daubert Chemical Co.
Diversey Corp.
DuPont, E. I., de Nemours & Co., Inc.
Fine Organics, Inc.
Finnell System, Inc.
Flor-Dry Co.
Hillyard Chemical Co.
Houghton, E. F., & Co.
Huntington Laboratories, Inc.
Johnson, S. C., & Son, Inc.
Legge, Walter G., Co., Inc.
Magnus Chemical Co., Inc.
Masury-Young Co.
Miracle Adhesives Corp.
Moore, John B., Corp.
Multi-Clean Prod., Inc.
National Disinfectant Co.
Oakite Products, Inc.
Packwood, G. H., Mfg. Co.
Penetone Co.
Practical Mfg. Co.
Rochester Safety Equip. Co., Inc.
Sugar Beet Prod. Co.
Tect, Inc.
Turco Products, Inc.
West Chemical Products, Inc.
Worrell-Consolidated Laboratories
Wyandotte Chemicals Corp.

Cleaning Machines, Floor

Brulin & Co., Inc.
Clarke Sanding Machine Co.
Diversey Corp.
Doyle Vacuum Cleaner Co.
Finnell System, Inc.
Handling Devices Co., Inc.
Hillyard Chemical Co.
Holt Mfg. Co.
Huntington Laboratories, Inc.
Johnson, S. C., & Son, Inc.
Kent Co., Inc.
Masury-Young Co.
Moore, John B., Corp.
Multi-Clean Prod., Inc.
West Chemical Products, Inc.
Worrell-Consolidated Laboratories

Cleaning Tissues, Goggle

American Optical Co.
Boyer-Campbell Co.
Carhoff Co.
Dow Corning Corp.
Fisher Scientific Co.
Industrial Prod. Co.
Karel First Aid Supply Co.
Kimball Safety Prod. Co.
Lensclean, Inc.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Silicone Paper Co. of America, Inc.
Standard Glove Co.
Standard Safety Equipment Co.
United States Safety Service Co.
Wilkins Co., Inc.

Climbers for Linemen

McDonald, B. F., Co.
Miller Equip. Co., Inc.
Mine Safety Appliances Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Standard Glove Co.

Cloth, Asbestos

Raybestos-Manhattan, Inc.

Cloth, Coated, Safety

Advance Glove Mfg. Co.
Aljay Mfg. Co., Inc.
Associated Bag & Apron Co.
Boyer-Campbell Co.
Frommelt Industries
Fyrepel Prod. Inc.
Holcomb Safety Garment Co.
Industrial Gloves Co.
Jomac, Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Minnesota Mining & Mfg. Co.
Racine Glove Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Sawyer-Tower, Inc.
Snyder, M. L., & Son, Inc.
Wheeler Protective Apparel, Inc.

Clothing, Acid Resistant

Adair, Robbin W., Co.
Advance Glove Mfg. Co.
American Allsafe Co., Inc.
American Optical Co.
Chem-Wear, Inc.
Dunn Products
Fisher Scientific Co.
Fyrepel Prod. Inc.
General Scientific Equip. Co.
Goodall Rubber Co.
Industrial Gloves Co.
Industrial Prod. Co.
Institute of Industrial Launderers
Jomac, Inc.
Karel First Aid Supply Co.
Kennedy-Ingalls, Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Midwest Glove Co., Inc.
Milburn Co.
Mine Safety Appliances Co.
Olympic Glove Co., Inc.
Piasco Safety Prod. Co.
Pulmosan Safety Equip. Corp.
Racine Glove Co., Inc.
Record Industrial Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Salisbury, W. H., & Co.
Sawyer-Tower, Inc.
Scientific Industrial Supply Co.
Seco Safety Products Co.
Setlow, M., & Son, Inc.
Snyder, M. L., & Son, Inc.
Standard Glove Co.
Standard Safety Equipment Co.
Union Industrial Equip. Corp.
Wheeler Protective Apparel, Inc.
Worklon, Inc.

Clothing, Fireproofed

Adair, Robbin W., Co.
Advance Glove Mfg. Co.
Aljay Mfg. Co., Inc.
American Allsafe Co., Inc.
American Optical Co.
Boyer-Campbell Co.
Dunn Products
Frommelt Industries
Fyrepel Prod. Inc.
General Scientific Equip. Co.
Holcomb Safety Garment Co.
Industrial Gloves Co.
Industrial Prod. Co.
Institute of Industrial Launderers
Kennedy-Ingalls, Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Midwest Glove Co., Inc.
Milburn Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Pulmosan Safety Equip. Corp.
Racine Glove Co., Inc.
Record Industrial Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Sawyer-Tower, Inc.
Seco Safety Products Co.
Setlow, M., & Son, Inc.
Snyder, M. L., & Son, Inc.
Standard Glove Co.
Standard Safety Equipment Co.
Wheeler Protective Apparel, Inc.

Clothing, Industrial

Adair, Robbin W., Co.
Advance Glove Mfg. Co.
Aljay Mfg. Co., Inc.
American Allsafe Co., Inc.
American Optical Co.
Boyer-Campbell Co.
Bullard, E. D., Co.
Charleston Rubber Co.
Dorsey, John E., Co.
Dunn Products
Fyrepel Prod. Inc.
General Scientific Equip. Co.
Goodall Rubber Co.
Holcomb Safety Garment Co.
Industrial Gloves Co.
Industrial Prod. Co.
Institute of Industrial Launderers
Kennedy-Ingalls, Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Midwest Glove Co., Inc.
Milburn Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Plastimayd Prod. Corp.
Pulmosan Safety Equip. Corp.
Racine Glove Co., Inc.
Record Industrial Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Salisbury, W. H., & Co.
Sawyer-Tower, Inc.
Scientific Industrial Supply Co.
Setlow, M., & Son, Inc.
Snyder, M. L., & Son, Inc.
Standard Glove Co.
Standard Safety Equipment Co.
Wheeler Protective Apparel, Inc.
Worklon, Inc.

Clothing, Linemen's

Aljay Mfg. Co., Inc.
American Optical Co.
Bashlin, W. M., Co.
Charleston Rubber Co.
Dorsey, John E., Co.
Dunn Products
Goodall Rubber Co.
Industrial Prod. Co.
Jomac, Inc.
McDonald, B. F., Co.
Midwest Glove Co., Inc.
Mine Safety Appliances Co.
Olympic Glove Co., Inc.
Plastimayd Prod. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Salisbury, W. H., & Co.
Sawyer-Tower, Inc.
Scientific Industrial Supply Co.
Snyder, M. L., & Son, Inc.
Standard Glove Co.

Clothing, Plastic

Plastimayd Prod. Corp.

Clothing, Protective

Adair, Robbin W., Co.
Advance Glove Mfg. Co.
Aljay Mfg. Co., Inc.
American Optical Co.
Boyer-Campbell Co.
Dorsey, John E., Co.
Dunn Products
Fisher Scientific Co.
Frommelt Industries
Fyrepel Prod. Inc.
Gebhardt, A. L., Co.
General Scientific Equip. Co.
Goodall Rubber Co.
Holcomb Safety Garment Co.
Industrial Gloves Co.
Industrial Prod. Co.
Institute of Industrial Launderers
Jomac, Inc.
Kennedy-Ingalls, Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Midwest Glove Co., Inc.
Milburn Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Piasco Safety Prod. Co.
Plastimayd Prod. Corp.
Pulmosan Safety Equip. Corp.
Racine Glove Co., Inc.
Record Industrial Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Sawyer-Tower, Inc.
Scientific Industrial Supply Co.
Seco Safety Products Co.
Setlow, M., & Son, Inc.
Singer Glove Mfg. Co.
Snyder, M. L., & Son, Inc.
Standard Glove Co.
Standard Safety Equipment Co.
United States Rubber Co.
West Chemical Products, Inc.
Wheeler Protective Apparel, Inc.

Clothing, Rubber

Advance Glove Mfg. Co.
American Optical Co.
Dorsey, John E., Co.
Dunn Products
General Scientific Equip. Co.
Goodall Rubber Co.
Industrial Gloves Co.
Industrial Prod. Co.
Jomac, Inc.
McDonald, B. F., Co.
Midwest Glove Co., Inc.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Pulmosan Safety Equip. Corp.
Record Industrial Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Sawyer-Tower, Inc.
Scientific Industrial Supply Co.
Seco Safety Products Co.
Snyder, M. L., & Son, Inc.
Standard Glove Co.
Standard Safety Equipment Co.

Clothing, Weatherproof

Advance Glove Mfg. Co.
American Optical Co.
Bashlin, M. W., Co.
Boyer-Campbell Co.
Dorsey, John E., Co.
Dunn Products
Industrial Prod. Co.
Jomac, Inc.
McDonald, B. F., Co.
Midwest Glove Co., Inc.
Milburn Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Plastimayd Prod. Corp.
Record Industrial Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Sawyer-Tower, Inc.
Scientific Industrial Supply Co.
Snyder, M. L., & Son, Inc.
Standard Glove Co.
Wheeler Protective Apparel, Inc.

Clothing for Women Workers

Advance Glove Mfg. Co.
American Optical Co.
Dunn Products
Fyrepel Prod. Inc.
Industrial Gloves Co.
Industrial Prod. Co.
McDonald, B. F., Co.
Midwest Glove Co., Inc.
Milburn Co.
Olympic Glove Co., Inc.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Sawyer-Tower, Inc.
Scientific Industrial Supply Co.
Setlow, M., & Son, Inc.
Snyder, M. L., & Son, Inc.
Wheeler Protective Apparel, Inc.
Worklon Inc.

Coffee Carrier-Dispensers

Vacuum Can Co.

Conductive Floor Tester

Hewson Co., Inc.

Conductive Shoe Tester

Hewson Co., Inc.

Conductometer

Conductive Hospital Accessories Corp.

Connecting Link

Columbus McKinnon Chain Corp.

See directory of Safety Equipment Sources for addresses.

Connectors, Electrical
Ericson Mfg. Co.
Pyle-National Co.

Connectors, Wire Rope
Macwhyte Co.

Containers, Explosive Liquid
Eagle Mfg. Co.
McDowell Mfg. Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.

Conveyors
Link-Belt Co.
Spencer Turbine Co.
United States Rubber Co.

Cords, Electric
Ericson Mfg. Co.

Cords, Extension
Ericson Mfg. Co.

Cots
Bomgardner Mfg. Co.
Frank Mfg. Co., Inc.
General Scientific Equip. Co.
Karel First Aid Supply Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Safety First Supply Co.
Scientific Industrial Supply Co.
Searjeant Metal Products, Inc.
Standard Glove Co.
Washington Prod. Co.

Cots, Finger
Advance Glove Mfg. Co.
Aljay Mfg. Co., Inc.
Allied Glove Corp.
American Optical Co.
Boyer-Campbell Co.
Brossard, Lester L., Co.
Davis Emergency Equip. Co., Inc.
Fisher Scientific Co.
General Scientific Equip. Co.
Halperin, A. E., Co., Inc.
Holcomb Safety Garment Co.
Industrial Gloves Co.
Industrial Prod. Co.
Karel First Aid Supply Co.
Kennedy-Ingalls, Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Medical Supply Co.
Midwest Glove Co., Inc.
Mine Safety Appliances Co.
Olympic Glove Co., Inc.
Pac-Kit Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Snyder, M. L., & Son, Inc.
Standard Glove Co.
Wheeler Protective Apparel, Inc.
Wilson Rubber Co.

Cover Lens
American Industrial Safety Equip. Co., Inc.
American Optical Co.
Boyer-Campbell Co.
Chicago Eye Shield Co.
Dockson Corp.
Fibre-Metal Prod. Co.
General Scientific Equip. Co.
Glendale Optical Co., Inc.
Industrial Prod. Co.
Jackson Products
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Olympic Glove Co., Inc.
Pioneer Scientific Corp.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Sellstrom Mfg. Co.
Standard Glove Co.
Standard Safety Equipment Co.
United States Safety Service Co.
Welsh Mfg. Co.
Willson Products Div.

Cover Lifter
McDonald, B. F., Co.

Covers, Machine, Plastic
Plastimayd Prod. Corp.

Covers, Self-Closing
Protectoseal Co.
Rochester Safety Equip. Co., Inc.
Witt Cornice Co.

Crane, Safety Warning Device
Dillon, W. C., & Co., Inc.
Electro-Alarm Safety Devices
Falcon Alarm Co., Inc.
McDonald, B. F., Co.
Safety First Supply Co.

Curtains, Fireproofed
Advance Glove Mfg. Co.
American Allsafe Co., Inc.
American Optical Co.
Associated Bag & Apron Co.
Bemis Bros. Bag Co., TransWall Coated Prod.
Boyer-Campbell Co.
Dunn Products
Frommelt Industries
Fyrepel Prod. Inc.
General Scientific Equip. Co.
Holcomb Safety Garment Co.
Industrial Gloves Co.
Industrial Prod. Co.
Karel First Aid Supply Co.
Kennedy-Ingalls, Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Pulmosan Safety Equip. Corp.
Racine Glove Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Sawyer-Tower, Inc.
Scientific Industrial Supply Co.
Seco Safety Products Co.
Standard Glove Co.
Standard Safety Equipment Co.
Wheeler Protective Apparel, Inc.

Curtains, Welder's
Advance Glove Mfg. Co.
Allied Glove Corp.
American Allsafe Co., Inc.
American Optical Co.
Associated Bag & Apron Co.
Bemis Bros. Bag Co., TransWall Coated Prod.
Boyer-Campbell Co.
Central Safety Equip. Co.
Cotton Goods Mfg. Co.
Dunn Products
Frommelt Industries
Fyrepel Prod. Inc.
General Scientific Equip. Co.
Holcomb Safety Garment Co.
Industrial Gloves Co.
Industrial Prod. Co.
Kennedy-Ingalls, Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Pulmosan Safety Equip. Corp.
Racine Glove Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Sawyer-Tower, Inc.
Searjeant Metal Products, Inc.
Seco Safety Products Co.
Smith, A., & Son, Inc.
Standard Glove Co.
Standard Safety Equipment Co.
Wheeler Protective Apparel, Inc.

Cutters, Wire Rope
Montgomery & Co., Inc.

D

Degreasers—Parts
Associated Just Distributors, Inc.
Brulin & Co., Inc.
Curran Corp.
Magnus Chemical Co., Inc.
Moore, John B., Corp.
National Disinfectant Co.
Packwood, G. H., Mfg. Co.
Tect, Inc.

Deodorizing Appliances
Associated Just Distributors, Inc.
Huntington Laboratories, Inc.
Karel First Aid Supply Co.
Oxy-Catalyst, Inc.
Rochester Safety Equip. Co., Inc.
West Chemical Products, Inc.

Detectors, Carbon Monoxide
Bacharach Industrial Instrument Co.
Davis Emergency Equip. Co., Inc.
McDonald, B. F., Co.
Medical Supply Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Taller & Cooper, Inc.
United States Safety Service Co.

Detectors, Fire
American District Telegraph Co.
Edwards Co., Inc.
Falcon Alarm Co., Inc.
Fyr-Fyter Co.
The Gamewell Co.
Grinnell Co.
Kidde, Walter, & Co., Inc.
Notifier Corp.
Pyrotronics, Div. of Baker Industries, Inc.
Rochester Safety Equip. Co., Inc.
Rockwood Sprinkler Co.

Detectors, Gas
Bacharach Industrial Instrument Co.
Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
Johnson-Williams, Inc.
Linde Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Taller & Cooper, Inc.

Detectors, Radiation
Eastman Kodak Co.
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
Union Industrial Equip. Corp.

Detectors, Smoke
American District Telegraph Co.
Kidde, Walter, & Co., Inc.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pyrene-C-O-Two Div., Fyr-Fyter Co.
Pyrotronics, Div. of Baker Industries, Inc.
Rochester Safety Equip. Co., Inc.

Detectors, Static
Hewson Co., Inc.

Directory of Codes, Standards, References
Loss Control Associates

Disinfectants and Deodorants
Associated Just Distributors, Inc.
Brulin & Co., Inc.
Dameron Enterprises, Inc.
Diversey Corp.
Halperin, A. E., Co., Inc.
Hillyard Chemical Co.
Huntington Laboratories, Inc.
Karel First Aid Supply Co.
McDonald, B. F., Co.
National Disinfectant Co.
Oakite Products, Inc.
Penetone Co.
Rochester Safety Equip. Co., Inc.
Scientific Industrial Supply Co.
Sindar Corp.
Sugar Beet Prod. Co.
West Chemical Products, Inc.
Worrell-Consolidated Laboratories
Wyandotte Chemicals Corp.

Dispensary Equipment
Davis Emergency Equip. Co., Inc.
General Scientific Equip. Co.
Halperin, A. E., Co., Inc.
Karel First Aid Supply Co.
Rochester Safety Equip. Co., Inc.

Dispensers, Foot Spray
McDonald, B. F., Co.
Plax Corp.
Sani-Mist, Inc.

Dispensers, Protective Ointments
Chemical Corp.
Dameron Enterprises, Inc.
Hygiene Research Inc.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Packwood, G. H., Mfg. Co.
Rochester Safety Equip. Co., Inc.
Vanfaire, Co.
Vestal, Inc.
West Chemical Products, Inc.

Dockboards
Magline Inc.
Magnesium Co. of America
Safety First Supply Co.
Searjeant Metal Products, Inc.

Dock Shelter
Frommelt Industries

Doors, Fire and Service
Rochester Safety Equip. Co., Inc.

Doors, Fire Resistant
Rysdon Products Co., Noise Control Div.

Doors, Panic Device
Rysdon Products Co., Noise Control Div.

Drill Table, Safety
Modern Machine Tool Co.
Montgomery & Co., Inc.

Drinking Cups, Paper
Continental Can Co.
Dixie Cup Div., American Can Co.
Karel First Aid Supply Co.
Medical Supply Co.
Pac-Kit Co.
Rochester Safety Equip. Co., Inc.
Scientific Industrial Supply Co.
Scott Paper Co.
United States Envelope Co.

Drinking Fountains
Bradley Washfountain Co.
Haws Drinking Faucet Co.
Karel First Aid Supply Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Taylor, Halsey W., Co.

Drinking Fountains, Portable
Haws Drinking Faucet Co.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

Driver Training Materials
Keystone View Co.
National Safety Council
Porto-Clinic Instruments, Inc.

To locate Advertisements, see Advertisers' Index.

Drum Fittings
New Jersey Safety Equip. Co.
Protectoseal Co.
Rochester Safety Equip. Co., Inc.

Drum Movers
American Hoist & Derrick Co.
Industrial Prod. Co.
Merrill Brothers, Inc.
Morse Mfg. Co., Inc.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
West Bend Equip. Corp.
Witt Cornice Co.

Drum Openers
Industrial Prod. Co.
Merrill Brothers, Inc.
Morse Mfg. Co., Inc.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.

Drum Valve
Central Safety Equip. Co.
Morse Mfg. Co., Inc.
Protectoseal Co.,
Rochester Safety Equip. Co., Inc.

Dryers, Electric, Safety Equipment
Chicago Hardware Foundry Co.
Engineering Corp. of America
Nobles Engineering & Mfg. Co.

Dryers, Face and Hand Electric
Chicago Hardware Foundry Co.
General Scientific Equip. Co.
Huntington Laboratories, Inc.

Dryers, Fire Hose
Circul-Air Corp.

Dumpers, R. R. Car
Link-Belt Co.

Dust Arresters
Associated Just Distributors, Inc.
Day Co., The
Hillyard Chemical Co.
New Jersey Safety Equip. Co.
Northern Blower Co.
Pangborn Corp.
Ruemelin Mfg. Co.
Schmieg Industries

Dust Collectors
Craftools, Inc.
Davis Emergency Equip. Co., Inc.
Day Co., The
Northern Blower Co.
Pangborn Corp.
Rochester Safety Equip. Co., Inc.
Schmieg Industries
United States Hoffman Machinery Corp.

Dust Control Systems
Craftools, Inc.
Day Co., The
Institute of Industrial Launderers
Northern Blower Co.
Pangborn Corp.
Schmieg Industries
United States Hoffman Machinery Corp.
West Chemical Products, Inc.

Dust Counter
McDonald, B. F., Co.
Mine Safety Appliances Co.
Safety First Supply Co.

Dust Hoods
American Optical Co.
Chicago Eye Shield Co.
Craftools, Inc.
Day Co., The
Engineering Corp. of America
Industrial Prod. Co.
Kennedy-Ingalls, Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Plastimayd Prod. Corp.
Pulmosan Safety Equip. Corp.
Safety First Supply Co.
Sawyer-Tower, Inc.
Schmieg Industries
Standard Glove Co.
Standard Safety Equipment Co.
Wheeler Protective Apparel, Inc.
Willson Products Div.

Dust Suction Equipment
Engineering Corp. of America

Dusters, Rock
McDonald, B. F., Co.
Mine Safety Appliances Co.

Dyna-Switch
Dillon, W. C., & Co., Inc.

E

Ear Stopples
Flents Products Co., Inc.
General Scientific Equip. Co.,
Karel First Aid Supply Co.
Maico Electronics, Inc.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Standard Safety Equipment Co.
Surgical Mechanical Research, Inc.

Electrode Holders
Buhrke, R. H., Co.
Fibre-Metal Prod. Co.
General Scientific Equip. Co.
Jackson Products
McDonald, B. F., Co.
Rochester Safety Equip. Co., Inc.

Electronic Indicating Ground
Davis Emergency Equip. Co., Inc.
Hewson Co., Inc.

Elevating Table
Hamilton Tool Co.
Montgomery & Co., Inc.
West Bend Equip. Corp.

Elevator, Personnel, Demountable
Hawkeye Products Corp.

Emblems, Safety
Award Incentives, Inc.
Brady, W. H., Co.
Metal Arts Co., Inc.
National Safety Council
New Jersey Safety Equip. Co.
Ready Made Sign Co., Inc.
Searjeant Metal Products, Inc.
Sohl Company
Tedcar Products Co.
Williams Jewelry & Mfg. Co.

Emergency Lighting
American Optical Co.
Boyer-Campbell Co.
Crouse-Hinds Co.
Dietz, R. E., Co.
Electric Cord Co.
Electric Storage Battery Co.,
Exide Industrial Div.
Emarco Corp.
General Scientific Equip. Co.
Gould-National Batteries,
Nicad Div., Inc.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Nickel Cadmium Battery Corp.
Prairie State Prod. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Snyder, M. L., & Son, Inc.
Tedcar Products Co.
U-C-Lite Mfg. Co.

Enclosures, Machine, Sound Reducing
Ryadon Products Co.,
Noise Control Div.

Exhaust Purifier
Monsanto Chemical Co.
National Mine Service Co.
Oxy-Catalyst, Inc.

Explosion-Proof Switches
New Jersey Safety Equip. Co.
Pyle-National Co.

Explosives Carrier
McDonald, B. F., Co.
Mine Safety Appliances Co.

Eye Shades, Non-Flammable
Chicago Eye Shield Co.
General Scientific Equip. Co.
Glendale Optical Co., Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Montgomery & Co., Inc.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

Eye Shields
American Industrial Safety Equip. Co., Inc.
American Optical Co.
Bausch & Lomb Optical Co.
Bullard, E. D., Co.
Chicago Eye Shield Co.
Dickson Corp.
Dunn Products
Eastern Safety Equip. Co.
Fibre-Metal Prod. Co.
Fisher Scientific Co.
General Scientific Equip. Co.
Gentex Corp.
Glendale Optical Co., Inc.
Industrial Prod. Co.
Jackson Products
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Pioneer Scientific Corp.
Plasco Safety Prod. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Sellstrom Mfg. Co.
Standard Glove Co.
Standard Safety Equipment Co.
United States Safety Service Co.
Watchemoket Optical Co., Inc.
Welsh Mfg. Co.

Eye Washing Fountain
Benson and Assoc.
Central Safety Equip. Co.
Engineering Corp of America
Fisher Scientific Co.
General Scientific Equip. Co.
Haws Drinking Faucet Co.
Karel First Aid Supply Co.
McDonald B. F., Co.
Moriand Associates
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Speakman Co.
Standard Glove Co.
Standard Safety Equipment Co.

Eyesight Surveys
Sellstrom Mfg. Co.
United States Safety Service Co.

F

Face Shields
American Industrial Safety Equip. Co., Inc.
American Optical Co.
Boyer-Campbell Co.
Bullard, E. D., Co.
Chicago Eye Shield Co.
Dickson Corp.
Dunn Products
Eastern Safety Equip. Co.
Fendall Company
Fibre-Metal Prod. Co.
Fisher Scientific Co.
Fyrepel Prod. Inc.
General Scientific Equip. Co.
Glendale Optical Co., Inc.
Industrial Gloves Co.
Industrial Prod. Co.
Jackson Products
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Scientific Industrial Supply Co.
Searjeant Metal Products, Inc.
Sellstrom Mfg. Co.
Standard Glove Co.
Standard Safety Equipment Co.
United States Safety Service Co.
Watchemoket Optical Co., Inc.
Welsh Mfg. Co.
Wheeler Protective Apparel, Inc.
Willson Products Div.

Fans, Exhaust
American Machine & Metals, Inc.,
DeBothezat Fans Div.
Buffalo Forge Co.
Coppus Engineering Corp.
DeVilbiss Co.
Engineering Corp. of America
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
Robbins & Myers, Inc.
Rochester Safety Equip. Co., Inc.

Fans, Ventilating
American Machine & Metals, Inc.,
DeBothezat Fans Div.
Buffalo Forge Co.
Coppus Engineering Corp.
Engineering Corp. of America
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
Robbins & Myers, Inc.
Rochester Safety Equip. Co., Inc.

Faucets, Self-Closing
Central Safety Equip. Co.
General Scientific Equip. Co.
New Jersey Safety Equip. Co.
Protectoseal Co.
Rochester Safety Equip. Co., Inc.

Feeders, Punch Press
Industrial Prod. Co.
Littell, F. J., Machine Co.
Vac-U-Mation Div.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Searjeant Metal Products, Inc.

Fence, Chain Link
Continental Steel Corp.

Film Badge Service
McDonald, B. F., Co.
Sohl Company

Films or Slides, Safety
Association Films Inc.
Lehigh Safety Shoe Co.
Modern Talking Picture Service, Inc.
National Safety Council
Whitney, L. A., Associates, Inc.

Filters, Air Device
Coppus Engineering Corp.
DeVilbiss Co.
Engineering Corp. of America

See directory of Safety Equipment Sources for addresses.

Mine Safety Appliances Co.
Rochester Safety Equip. Co., Inc.
Schrader's, A., Son, Div. of Scovill Mfg. Co., Inc.
Willson Products Div.

Fire Doors

Fyr-Fyter Co.
Rochester Safety Equip. Co., Inc.

Fire Extinguishers

American LaFrance Corp.
Ansul Chemical Co.
Boyer-Campbell Co.
Buffalo Fire Appliance Corp.
Dietz, R. E., Co.
Elkhart Brass Mfg. Co., Inc.
Fisher Scientific Co.
Fyr-Fyter Co.
General Fire Extinguisher Corp.
Interstate Precision Products Corp.
Kidde, Walter & Co., Inc.
Leeder Mfg. Co., Inc.
M-M-A, Inc.
National Foam System, Inc.
Pulmosan Safety Equip. Corp.
Pyrene-C-O-Two Div., Fyr-Fyter Co.
Randolph Laboratories, Inc.
Red Comet, Inc.
Rochester Safety Equip. Co., Inc.
Rockwood Sprinkler Co.
Safety First Prod. Corp.
Safety First Supply Co.
Scientific Industrial Supply Co.
Searjeant Metal Products, Inc.
Seco Safety Products Co.
Snyder, M. L., & Son, Inc.
Stop-Fire, Inc.

Fire Extinguisher Recharges and Equipment

American LaFrance Corp.
Ansul Chemical Co.
Boyer-Chemical Co.
Buffalo Fire Appliance Corp.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co.
General Fire Extinguisher Corp.
Kidde, Walter, & Co., Inc.
Leeder Mfg. Co., Inc.
National Foam System, Inc.
Pulmosan Safety Equip. Corp.
Pyrene-C-O-Two Div., Fyr-Fyter Co.
Randolph Laboratories, Inc.
Red Comet, Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Scientific Industrial Supply Co.
Seco Safety Products Co.
Snyder, M. L., & Son, Inc.
Stop-Fire, Inc.

Fire Extinguisher Seals

Fyr-Fyter Co.
General Fire Extinguisher Corp.
Red Comet, Inc.
Rochester Safety Equip. Co., Inc.
Seco Safety Products Co.
Snyder, M. L., & Son, Inc.

Fire Extinguishing Foam

American LaFrance Corp.
Boyer-Campbell Co.
Buffalo Fire Appliance Corp.
Central Safety Equip. Co.
Fyr-Fyter Co.
General Fire Extinguisher Corp.
Grinnell Co.
National Foam System, Inc.
Pulmosan Safety Equip. Corp.
Pyrene-C-O-Two Div., Fyr-Fyter Co.
Randolph Laboratories, Inc.
Red Comet, Inc.
Rochester Safety Equip. Co., Inc.
Rockwood Sprinkler Co.
Scientific Industrial Supply Co.
Snyder, M. L., & Son, Inc.

Fire Extinguishing Systems

American LaFrance Corp.
Ansul Chemical Co.
Buffalo Fire Appliance Corp.
Cardox Corp.
Central Automatic Sprinkler Co.
Engineering Corp. of America
Fyr-Fyter Co.
General Fire Extinguisher Corp.
Grinnell Co.
Kidde, Walter, & Co., Inc.
National Foam System, Inc.
Pyrene-C-O-Two Div., Fyr-Fyter Co.
Randolph Laboratories, Inc.
Red Comet, Inc.
Rochester Safety Equip. Co., Inc.
Rockwood Sprinkler Co.
Snyder, M. L., & Son, Inc.

Fire Foam Generators

American LaFrance Corp.
Buffalo Fire Appliance Corp.
Cardox Corp.
Fyr-Fyter Co.
National Foam System, Inc.
Rochester Safety Equip. Co., Inc.
Snyder, M. L., & Son, Inc.

Fire Hose

American LaFrance Corp.
Buffalo Fire Appliance Corp.
Fyr-Fyter Co.
General Fire Extinguisher Corp.
Goodall Rubber Co.
Mine Safety Appliances Co.
National Foam System, Inc.
Pyrene-C-O-Two Div., Fyr-Fyter Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Seco Safety Products Co.
Snyder, M. L., & Son, Inc.
United States Rubber Co.
Wirt & Knox Mfg. Co.

Fire Hose Reels

American LaFrance Corp.
Buffalo Fire Appliance Corp.
Central Safety Equip. Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co.
General Fire Extinguisher Corp.
Kidde, Walter, & Co., Inc.
National Foam System, Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Seco Safety Products Co.
Snyder, M. L., & Son, Inc.
Wirt & Knox Mfg. Co.

Fire Ladders, Aluminum

Duo-Safety Ladder Corp.

Fire Ladders, Wood

Duo-Safety Ladder Corp.

Fire Nozzles

American LaFrance Corp.
Buffalo Fire Appliance Corp.
Central Safety Equip. Co.
Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co.
General Fire Extinguisher Corp.
National Foam System, Inc.
Pyrene-C-O-Two Div., Fyr-Fyter Co.
Rochester Safety Equip. Co., Inc.
Rockwood Sprinkler Co.
Safety First Supply Co.
Seco Safety Products Co.
Snyder, M. L., & Son, Inc.
Wirt & Knox Mfg. Co.

Fire Pumps

American LaFrance Corp.
Rochester Safety Equip. Co., Inc.

Fire Sirens

American LaFrance Corp.
Edwards Co., Inc.
Federal Sign and Signal Corp.
General Fire Extinguisher Corp.
Notifier Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

Fire Trucks

American LaFrance Corp.
Ansul Chemical Co.
Cardox Corp.
Engineering Corp of America
Mine Safety Appliances Co.
National Foam System, Inc.
Seco Safety Products Co.

First Aid Cabinets

Boyer-Campbell Co.
Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
Fisher Scientific Co.
General Scientific Equip. Co.
Halperin, A. E., Co., Inc.
Industrial Prod. Co.
Karel First Aid Supply Co.
Kip, Inc.
McDonald, B. F., Co.
Medical Supply Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Searjeant Metal Products, Inc.

First Aid Kits

Boyer-Campbell Co.
Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
Fisher Scientific Co.
General Scientific Equip. Co.
Halperin, A. E., Co., Inc.
Industrial Prod. Co.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Medical Supply Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pac-Kit Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Searjeant Metal Products, Inc.

First Aid Materials

Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
Fisher Scientific Co.
General Scientific Equip. Co.
Halperin, A. E., Co., Inc.
Industrial Prod. Co.
Karel First Aid Supply Co.
Kip, Inc.
McDonald, B. F., Co.
Medical Supply Co.
Mine Safety Appliances Co.
Pac-Kit Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Searjeant Metal Products, Inc.

First Aid Room Equipment

Davis Emergency Equip. Co., Inc.
General Scientific Equip. Co.
Halperin, A. E., Co., Inc.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Medical Supply Co.
Mine Safety Appliances Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

First Aid Trainer

Loss Control Associates

Flags, Danger

Canisteo Sign Mfg. Co., Inc.
Davis Emergency Equip. Co., Inc.
Dietz, R. E., Co.
Fyrepel Prod. Inc.
Industrial Prod. Co.
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
Plastimayd Prod. Corp.
Prairie State Prod. Co.
Pulmosan Safety Equip. Corp.
Ready Made Sign Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Sohl Company
Stonehouse Signs, Inc.
Tedcar Products Co.
Vari-Products Co.

Flags, Safety

Award Incentives, Inc.
Boyer-Campbell Co.
Canisteo Sign Mfg. Co., Inc.
Dietz, R. E., Co.
Fyrepel Prod. Inc.
Industrial Prod. Co.
McDonald, B. F., Co.
National Safety Council
New Jersey Safety Equip. Co.
Plastimayd Prod. Corp.
Prairie State Prod. Co.
Pulmosan Safety Equip. Corp.
Ready Made Sign Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Sohl Company
Tedcar Products Co.
Traffic Equip. Corp.

Flame Retardant for Fabrics

DuPont, E. I., de Nemours & Co., Inc.
Flamort Chemical Co.
Frommelt Industries
Huntington Laboratories, Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

Flame Retardant for Fibre Board

Flamort Chemical Co.

Flame Retardant for Wood

Flamort Chemical Co.

Flashlight Batteries

McDonald, B. F., Co.
National Carbon Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Willson Products Div.

Flashlights

Hornik, Frederick
Justrite Mfg. Co.
Karel First Aid Supply Co.
McDonald, B. F., Co.
National Carbon Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Willson Products Div.

Flashlights, Permissible

Justrite Mfg. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
National Carbon Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Willson Products Div.

Floodlights, Emergency

American Optical Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pyle-National Co.
Rochester Safety Equip. Co., Inc.
Snyder, M. L., & Son, Inc.
Swivelier Co., Inc.

Floor Cleaning Machines, Electric

Advance Floor Machine Co.
Brulin & Co., Inc.
Clarke Sanding Machine Co.
Finnell System, Inc.
Hillyard Chemical Co.
Holt Mfg. Co.
Huntington Laboratories, Inc.
Johnson, S. C., & Son, Inc.
Kent Co., Inc.
Masury-Young Co.
Multi-Clean Prod., Inc.
Noble Engineering & Mfg. Co.
Scientific Industrial Supply Co.
United Floor Machine Co.
West Chemical Products, Inc.
Worrell-Consolidated Laboratories

To locate Advertisements, see Advertisers' Index.

Floor Cleaning Machines, Electric, Explosion Proof
Hild Floor Machine Co., Inc.

Floor Coating, Conductive, Non-Slip
Associated Just Distributors, Inc.
Brulin & Co., Inc.
Custanite Corp.
Diversey Corp.
Eagle-Picher Co.
Hild Floor Machine Co., Inc.
Hillyard Chemical Co.
Huntington Laboratories, Inc.
Legge, Walter G., Co., Inc.
Miracle Adhesives Corp.
New Jersey Safety Equip. Co.
Penetone Co.
Reliance Steel Prod. Co.
Rochester Safety Equip. Co., Inc.
Vestal, Inc.
West Chemical Products, Inc.
Worrell-Consolidated Laboratories

Floor Finishing Compounds
Associated Just Distributors, Inc.
Brulin & Co., Inc.
Dolge, C. B., Co.
DuPont, E. I., de Nemours & Co., Inc.
Finnell System, Inc.
Hild Floor Machine Co., Inc.
Hillyard Chemical Co.
Huntington Laboratories, Inc.
Johnson, S. C., & Son, Inc.
Legge, Walter G., Co., Inc.
Masury-Young Co.
Multi-Clean Prod., Inc.
National Disinfectant Co.
Penetone Co.
Vestal, Inc.
West Chemical Products, Inc.
Worrell-Consolidated Laboratories

Floor Plate, Abrasive
Alan Wood Steel Co.
Aluminum Co. of America
Globe Company
Reliance Steel Prod. Co.

Floor Plate, Steel
Alan Wood Steel Co.
Globe Co.
Inland Steel Co.
Klemp Metal Grating Corp.
U. S. Steel Corp.

Flooring Materials, Safety
Alan Wood Steel Co.
American Abrasive Metals Co.
Brabrook, A. N., Inc.
Daubert Chemical Corp.
Flintkote Co.
Globe Co.
Joslin, Herbert A., Co.
Legge, Walter G., Co., Inc.
Masury-Young Co.
McDonald, B. F., Co.
Miracle Adhesives Corp.
Moor, D. W., Co.
Permamix Div.
Reliance Steel Prod. Co.
Rochester Safety Equip. Co., Inc.
United States Rubber Co.
Vestal, Inc.

Fluorescent Tube Changers
Pattern Products Co.

Fluorescent Tube Disposal
Laduby (Flur-o-Lock) Co., Inc.
New Jersey Safety Equip. Co.

Fluorescent Lamp Locks
Laduby (Flur-o-Lock) Co., Inc.

Fog Guns
Brulin & Co., Inc.
Diversey Corp.
Fyr-Fyter Co.

Fog-Nozzle
Buffalo Fire Appliance Corp.
Cardox Corp.
Central Safety Equip. Co.
Fyr-Fyter Co.
Fyrene-C-O-Two Div., Fyr-Fyter Co.
Rochester Safety Equip. Co., Inc.
Rockwood Sprinkler Co.
Safety First Supply Co.
Seco Safety Products Co.
Wirt & Knox Mfg. Co.

Foot Mats, Disinfecting
Brabrook, A. N., Inc.
Huntington Laboratories, Inc.
McDonald, B. F., Co.
Moor, D. W., Co.
Snyder, M. L., & Son, Inc.
United States Rubber Co.

Foot Mats, Skin-Toughening
McDonald, B. F., Co.
Onox, Inc.

Fume Collectors
Northern Blower Co.
Ruemelin Mfg. Co.

Fumigants
Dow Chemical Co.
Monsanto Chemical Co.
West Chemical Products, Inc.

Fungicides
Dolge, C. B., Co.
Dow Chemical Co.
Huntington Laboratories, Inc.
Karol First Aid Supply Co.
Monsanto Chemical Co.
Sani-Mist, Inc.
United States Rubber Co.
West Chemical Products, Inc.
Worrell-Consolidated Laboratories

Fuse Pullers
Safety First Supply Co.

G

Gage Glasses
Dockson Corp.
Glendale Optical Co., Inc.
New Jersey Safety Equip. Co.
Pioneer Scientific Corp.
Pittsburgh Plate Glass Co.
Sellstrom Mfg. Co.

Gastester
Davis Emergency Equip. Co., Inc.
Johnson-Williams, Inc.
Mine Safety Appliances Co.

Germicides
American Optical Co.
Associated Just Distributors, Inc.
Brulin & Co., Inc.
Dameron Enterprises, Inc.
Dow Chemical Co.
Huntington Laboratories, Inc.
Karol First Aid Supply Co.
Monsanto Chemical Co.
Oakite Products, Inc.
West Chemical Products, Inc.
Willson Products Div.
Worrell-Consolidated Laboratories
Wyandotte Chemicals Corp.

Glass, Safety
American Industrial Safety Equip. Co., Inc.
Bausch & Lomb Optical Co.
Boyer-Campbell Co.
Chicago Eye Shield Co.
General Scientific Equip. Co.
Glendale Optical Co., Inc.
Holcomb Safety Garment Co.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
Pittsburgh Plate Glass Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Scientific Industrial Supply Co.
Sellstrom Mfg. Co.
Standard Glove Co.
United States Safety Service Co.
Welsh Mfg. Co.
Willson Products Div.

Glass, Welding Plates and Lenses
American Industrial Safety Equip. Co., Inc.
American Optical Co.
Bausch & Lomb Optical Co.
Boyer-Campbell Co.
Chicago Eye Shield Co.
Dockson Corp.
Eastern Safety Equip. Co.
Fendall Company
Fibre-Metal Prod. Co.
General Scientific Equip. Co.
Glendale Optical Co., Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Pittsburgh Plate Glass Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Scientific Industrial Supply Co.
Sellstrom Mfg. Co.
Standard Glove Co.
Standard Safety Equipment Co.
United States Safety Service Co.
Welsh Mfg. Co.
Willson Products Div.

Glove, Reclaiming
Institute of Industrial Launderers
Scientific Industrial Supply Co.

Gloves and Mittens
Advance Glove Mfg. Co.
Aljay Mfg. Co., Inc.
Allied Glove Corp.
American Optical Co.
Bashlin, W. M., Co.
Boyer-Campbell Co.
Davids Gloves, Inc.
Dunn Products
Fisher Scientific Co.
Fyrepel Prod. Inc.
Gebhardt, A. L., Co.
General Scientific Equip. Co.
Goodall Rubber Co.
Granet Corp.
Holcomb Safety Garment Co.
Industrial Gloves Co.
Industrial Prod. Co.
Jomac, Inc.
Kennedy-Ingalls, Inc.
Kimball Safety Prod. Co.
Liberty Protective Leathers, Inc.
McDonald, B. F., Co.
Midwest Glove Co., Inc.
Millburn Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Pulmosan Safety Equip. Corp.
Racine Glove Co., Inc.
Record Industrial Co.
Riegel Textile Corp., Glove Div.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Salisbury, W. H., & Co.
Scientific Industrial Supply Co.
Scarjeant Metal Products, Inc.
Seco Safety Products Co.
Singer Glove Mfg. Co.
Snyder, M. L., & Son, Inc.
Standard Glove Co.
Surety Rubber Co.
Wheeler Protective Apparel, Inc.
Wilson Rubber Co.
Wolverine Shoe & Tanning Corp.

Gloves, Heat Resistant
Liberty Protective Leathers, Inc.

Gloves, Linemen's Protector
Advance Glove Mfg. Co.
Allied Glove Corp.
American Optical Co.
Bashlin, W. M. Co.
Charleston Rubber Co.
Davids Gloves, Inc.
Davis Emergency Equip. Co., Inc.
Dunn Products
Gebhardt, A. L., Co.
Goodall Rubber Co.
Industrial Gloves Co.
Industrial Prod. Co.
McDonald, B. F., Co.
Midwest Glove Co., Inc.
Miller Equip. Co., Inc.
Mine Safety Appliances Co.
Olympic Glove Co., Inc.
Racine Glove Co., Inc.
Record Industrial Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Salisbury, W. H., & Co.
Scientific Industrial Supply Co.
Scarjeant Metal Products, Inc.
Singer Glove Mfg. Co.
Snyder, M. L., & Son, Inc.
Standard Glove Co.
Surety Rubber Co.
Wheeler Protective Apparel, Inc.
Wilson Rubber Co.
Wolverine Shoe & Tanning Corp.

Gloves, Rubber or Synthetic
Advance Glove Mfg. Co.
Allied Glove Corp.
American Optical Co.
Charleston Rubber Co.
Davids Gloves, Inc.
Davis Emergency Equip. Co., Inc.
Dunn Products
Fisher Scientific Co.
General Scientific Equip. Co.
Goodall Rubber Co.
Granet Corp.
Hood Rubber Co.
Industrial Prod. Co.
Jomac, Inc.
Karol First Aid Supply Co.
McDonald, B. F., Co.
Midwest Glove Co., Inc.
Millburn Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Pioneer Rubber Co.
Pulmosan Safety Equip. Corp.
Record Industrial Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Salisbury, W. H., & Co.
Scientific Industrial Supply Co.
Scarjeant Metal Products, Inc.
Seco Safety Products Co.
Singer Glove Mfg. Co.
Snyder, M. L., & Son, Inc.
Standard Glove Co.
Standard Safety Equipment Co.
Surety Rubber Co.
United States Rubber Co.
Wilson Rubber Co.

Goggle Cleaner
American Optical Co.
Boyer-Campbell Co.
Chicago Eye Shield Co.
Dow Corning Corp.
Fisher Scientific Co.
General Scientific Equip. Co.
Industrial Prod. Co.
Karol First Aid Supply Co.
Kimball Safety Prod. Co.
Lenscleen, Inc.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Scarjeant Metal Products, Inc.
Silicone Paper Co. of America, Inc.
Standard Glove Co.
Standard Safety Equipment Co.
United States Safety Service Co.
Wilkins Co., Inc.
Willson Products Div.

Goggle Cleaning Dispensers
American Optical Co.
Boyer-Campbell Co.
Carhoff Co.
Dow Corning Corp.

See directory of Safety Equipment Sources for addresses.

General Scientific Equip. Co.
Industrial Prod. Co.
Karel First Aid Supply Co.
Kimball Safety Prod. Co.
Leuscinan, Inc.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Silicone Paper Co. of America, Inc.
Standard Glove Co.
Standard Safety Equipment Co.
United States Safety Service Co.
Wilkins Co., Inc.

Goggles

American Industrial Safety Equip. Co., Inc.
American Optical Co.
Bausch & Lomb Optical Co.
Boyer-Campbell Co.
Brossard, Lester L., Co.
Bullard, E. D., Co.
Chicago Eye Shield Co.
Cover, H. S.
Dockson Corp.
Eastern Safety Equip. Co.
Fendall Company
Fibre-Metal Prod. Co.
Fisher Scientific Co.
General Scientific Equip. Co.
Glendale Optical Co., Inc.
Industrial Prod. Co.
Jackson Products
Jones & Co.
Kimball Safety Prod. Co.
Linde Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Pisaco Safety Prod. Co.
Progress Industries, Inc.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Sellstrom Mfg. Co.
Standard Glove Co.
Standard Safety Equipment Co.
United States Safety Service Co.
Watchemoket Optical Co., Inc.
Welsh Mfg. Co.
Willson Products Div.

Gongs, Sirens, Horns and Other Signaling Devices

Edwards Co., Inc.
Falcon Alarm Co., Inc.
The Gamewell Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Snyder, M. L., & Son, Inc.
Tedcar Products Co.
Wheeler Protective Apparel, Inc.

Gratings, Safety

Borden Metal Products Co.
Boyer-Campbell Co.
Bustin Steel Products, Inc.
Klemp Metal Grating Corp.
Reliance Steel Prod. Co.

Grinders, Tool

Rochester Safety Equip. Co., Inc.

Grounding Device, Electronic

Gilbert & Barker Mfg. Co.
Hewson Co., Inc.
National Mine Service Co.

Guard Materials

Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.

Guards, All-Steel, Corner

Rochester Safety Equip. Co., Inc.

Guards for Edged Tools

Bashlin, W. M., Co.
Buhrke, R. H., Co.

Guards, Fan

General Scientific Equip. Co.
Industrial Gloves Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Scientific Industrial Supply Co.

Guards, Foot and Toe

Boyer-Campbell Co.
Ellwood Safety Appliance Co.
Industrial Gloves Co.
Lehigh Safety Shoe Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Pulmosan Safety Equip. Corp.
Reece Wooden Sole Shoe Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Standard Safety Equipment Co.
Surety Rubber Co.
Wheeler Protective Apparel, Inc.

Guards, Gear

Searjeant Metal Products, Inc.

Guards, Glass Gage

Boyer-Campbell Co.
Pittsburgh Plate Glass Co.
Safety Clothing & Equip. Co.

Guards, Grinders Portable

General Scientific Equip. Co.
Morrison Products, Inc.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.

Guards, Grinding Wheel

Chicago Eye Shield Co.
General Scientific Equip. Co.
Industrial Prod. Co.
Junkin Safety Appliance Co., Inc.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Standard Safety Equipment Co.

Guards, Guide Pin

Boyer-Campbell Co.
Central Safety Equip. Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Searjeant Metal Products, Inc.

Guards, Jointer

Boyer-Campbell Co.
Brett-Guard Co.
New Jersey Safety Equip. Co.
Peterson, R. E., Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Standard Safety Equipment Co.

Guards, Kick Press

Boyer-Campbell Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Schrader's A., Son,
Div. of Scovill Mfg. Co., Inc.
Searjeant Metal Products, Inc.

Guards, Lathe

New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.

Guards, Machine

Globe Company

Guards, Milling Machine

New Jersey Safety Equip. Co.
Searjeant Metal Products, Inc.

Guards, Planer

Safety Clothing & Equip. Co.

Guards, Platen Press

Rochester Safety Equip. Co., Inc.
Security Controls, Inc.

Guards, Portable Lamp

Ericson Mfg. Co.
Industrial Prod. Co.
McGill Mfg. Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Tedcar Products Co.

Guards, Power Press

American Allsafe Co., Inc.
Boyer-Campbell Co.
Junkin Safety Appliance Co., Inc.
Montgomery & Co., Inc.
New Jersey Safety Equip. Co.
Positive Safety Mfg. Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Safeguard Mfg. Co.
Schrader's A., Son,
Div. of Scovill Mfg. Co., Inc.
Searjeant Metal Products, Inc.
Security Controls, Inc.
Wiesman Mfg. Co., Inc.

Guards, Power Shear

New Jersey Safety Equip. Co.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Security Controls, Inc.

Guards, Saw

Boyer-Campbell Co.
Brett-Guard Co.
Buhrke, R. H., Co.
Central City Machine & Tool Co.
Joslin, Herbert A., Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Standard Safety Equipment Co.

Guards, Shaper

Boyer-Campbell Co.
DeWalt Div., American Machine & Foundry Co.
Peterson, R. E., Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.

Guards, Shin

Advance Glove Mfg. Co.
Boyer-Campbell Co.
Holcomb Safety Garment Co.
Kimball Safety Prod. Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Wheeler Protective Apparel, Inc.

Guards, Truck Radiator

Bustin Steel Products, Inc.

Guards, Wire

Ericson Mfg. Co.
Gets-A-Lite Co

H

Hair Guards

Boyer-Campbell Co.
General Scientific Equip. Co.
Industrial Prod. Co.
Kennedy-Ingalls, Inc.
McDonald, B. F., Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Scientific Industrial Supply Co.
Standard Glove Co.
Standard Safety Equipment Co.

Hand Cream, Protective

American Optical Co.
Ayerst Laboratories
Boyer-Campbell Co.
Breck, John H., Inc.
Brossard, Lester L., Co.
Chemical Corp.
Dameron Enterprises, Inc.
Davis Emergency Equip. Co., Inc.
DuPont, E. I., de Nemours & Co., Inc.
Fisher Scientific Co.
General Scientific Equip. Co.
Halperin, A. E., Co., Inc.
Hygiene Research Inc.
Industrial Prod. Co.
Karel First Aid Supply Co.
Magnus Chemical Co., Inc.
McDonald, B. F., Co.
Medical Supply Co.
Milburn Co.
Mine Safety Appliances Co.
Packwood, G. H., Mfg. Co.
Pulmosan Safety Equip. Corp.
Quickee Products, Inc.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Scientific Industrial Supply Co.
Searjeant Metal Products, Inc.
Standard Glove Co.
Stover, H. W., Co.
Vanfaire Co.
Vestal, Inc.
West Chemical Products, Inc.

Hand Guards

American Optical Co.
Industrial Gloves Co.
Industrial Prod. Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Pulmosan Safety Equip. Corp.
Riegel Textile Corp.,
Glove Div.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Security Controls, Inc.
Tamco, Inc.
Tool & Mfg. Co., Inc.
Wheeler Protective Apparel, Inc.

Handlines

Buhrke, R. H., Co.
Mathias Klein & Sons
Miller Equip. Co., Inc.

Hand Pumps

Engineering Corp. of America
General Scientific Equip. Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.

Harness, Industrial Safety

Bashlin, W. M., Co.
Boyer-Campbell Co.
Buhrke, R. H., Co.
Davis Emergency Equip. Co., Inc.
General Scientific Equip. Co.
Industrial Prod. Co.
Industrial Safety Belt Co.
Mathias Klein & Sons
McDonald, B. F., Co.
Miller Equip. Co., Inc.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Rose Mfg. Co.
Safety First Supply Co.
Standard Glove Co.

Hat Liner

American Allsafe Co., Inc.
American Industrial Safety Equip. Co., Inc.
Associated Bag & Apron Co.
Bashlin, W. M., Co.
Boyer-Campbell Co.
Bullard, E. D., Co.

To locate Advertisements, see Advertisers' Index.

Davis Emergency Equip. Co., Inc.
Eastern Safety Equip. Co.
Fibre-Metal Prod. Co.
General Scientific Equip. Co.
Gentex Corp.
Goodall Rubber Co.
Industrial Gloves Co.
Industrial Prod. Co.
Jackson Products
Kennedy-Ingalls, Inc.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Olympic Glove Co., Inc.
Pulmosan Safety Equip. Corp.
Racine Glove Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Scientific Industrial Supply Co.
Standard Glove Co.
Standard Safety Equipment Co.
Thompson Cap Co.
United States Safety Service Co.
Welsh Mfg. Co.
Willson Products Div.

Hats and Caps, Safety

American Industrial Safety Equip. Co., Inc.
Bashlin, W. M., Co.
Boyer-Campbell Co.
Brossard, Lester L., Co.
Bullard, E. D., Co.
Chic Maid Hat Mfg. Co., Inc.
Davis Emergency Equip. Co., Inc.
Fibre-Metal Prod. Co.
Fyrepel Prod. Inc.
General Scientific Equip. Co.
Gentex Corp.
Goodall Rubber Co.
Industrial Prod. Co.
Jackson Products
Kennedy-Ingalls, Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Milburn Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Scientific Industrial Supply Co.
Snyder, M. L., & Son, Inc.
Standard Safety Equipment Co.
Thompson Cap Co.
Welsh Mfg. Co.
Wheeler Protective Apparel, Inc.
Willson Products Div.

Hearing Aid

Acoustical Engineering Corp.
Amkeo, Inc.
Beltone Hearing Aid Co.
Maico Electronics, Inc.
Zenith Radio Corp.

Hearing Protector

American Optical Co.
Karel First Aid Supply Co.
Maico Electronics, Inc.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Rochester Safety Equip. Co., Inc.
Sigma Engineering Co.
Willson Products Div.

Heating Pads

Karel First Aid Supply Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.

Helmets, Firemen's

Bullard, E. D., Co.
Fyrepel Prod. Inc.
Fyr-Fyter Co.
Goodall Rubber Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Snyder, M. L., & Son, Inc.

Helmets, Sandblast

American Optical Co.
Boyer-Campbell Co.
Bullard, E. D., Co.
Chicago Eye Shield Co.
Fibre-Metal Prod. Co.
Industrial Gloves Co.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pangborn Corp.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Snyder, M. L., & Son, Inc.
Standard Safety Equipment Co.
Willson Products Div.

Helmets, Welding

American Industrial Safety Equip. Co., Inc.
American Optical Co.
Boyer-Campbell Co.
Brossard, Lester L., Co.
Bullard, E. D., Co.
Chicago Eye Shield Co.
Dockson Corp.
Dunn Products
Eastern Safety Equip. Co.
Fibre-Metal Prod. Co.
General Scientific Equip. Co.
Jackson Products
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Scientific Industrial Supply Co.
Sollstrom Mfg. Co.
Snyder, M. L., & Son, Inc.
Standard Glove Co.
Standard Safety Equipment Co.
Welsh Mfg. Co.
Willson Products Div.

Herbicides

U. S. Borax & Chemical Corp.,
Pacific Coast Borax Co. Div.

Hoists, Chain

Harrington Co.
New Jersey Safety Equip. Co.
Robbins & Myers, Inc.
Wright Hoist Div.,
American Chain & Cable Co., Inc.

Hoists, Electric

Wright Hoist Div.,
American Chain & Cable Co., Inc.

Holders, Soldering Irons, Adjustable

Wilder Mfg. Co., Inc.

Hoods, Acid

Boyer-Campbell Co.
Bullard, E. D., Co.
Chicago Eye Shield Co.
Engineering Corp. of America
Fisher Scientific Co.
Fyrepel Prod. Inc.
Industrial Gloves Co.
Industrial Prod. Co.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Sawyer-Tower, Inc.
Standard Glove Co.
Standard Safety Equipment Co.
Union Industrial Equip. Corp.
Wheeler Protective Apparel, Inc.

Hoods, Enameler's

Fibre-Metal Prod. Co.
General Scientific Equip. Co.
Industrial Gloves Co.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Standard Safety Equipment Co.
Wheeler Protective Apparel, Inc.

Hoods, Insulator

Fyrepel Prod. Inc.
New Jersey Safety Equip. Co.
Salisbury, W. H., & Co.

Hooks, Hoisting

Buhrke, R. H., Co.
Bullard, E. D., Co.
Columbus McKinnon Chain Corp.
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
Taylor, S. G., Chain Co., Inc.

Hooks, Safety Belt

Bashlin, W. M., Co.
Buhrke, R. H., Co.
Bullard, E. D., Co.
General Scientific Equip. Co.
McDonald, B. F., Co.
McDowell Mfg. Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

Hose, Lines

Elkhart Brass Mfg. Co., Inc.
Fyr-Fyter Co.
Goodall Rubber Co.
Rochester Safety Equip. Co., Inc.
Seco Safety Products Co.
Snyder, M. L., & Son, Inc.

Hose, Steam

Goodall Rubber Co.
Snyder, M. L., & Son, Inc.
United States Rubber Co.

Hospital Equipment, Industrial

Bomgardner Mfg. Co.
Chicago Hardware Foundry Co.
E & J Mfg. Co.
Edwards Co., Inc.
General Scientific Equip. Co.
Karel First Aid Supply Co.
Legge, Walter G., Co., Inc.
Multi-Clean Prod., Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

Hydraulic Fluid, Fire Resistant

Houghton, E. F., & Co.
Monsanto Chemical Co.
Shell Oil Co.

Hydrogen Analyzer

Johnson-Williams, Inc.
Mine Safety Appliances Co.

I

Ice Control Materials

Huntington Laboratories, Inc.
Morton Salt Co.
Rochester Safety Equip. Co., Inc.

Identification Equipment

Brady, W. H., Co.
Ready Made Sign Co., Inc.
Rochester Safety Equip. Co., Inc.
Stahl Company

Inclinators, Carboy

General Scientific Equip. Co.
Industrial Prod. Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.

Indicators, Carbon Monoxide

Fisher Scientific Co.
General Scientific Equip. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

Indicators, Flammable Vapors

Davis Emergency Equip. Co., Inc.
Johnson-Williams, Inc.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.

Indicators, Gas

Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
Johnson-Williams, Inc.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Union Industrial Equip. Corp.

Indicators, Oxygen Deficiency

Davis Emergency Equip. Co., Inc.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.

Indicators, Speed

Montgomery & Co., Inc.

Indicators, Static

Hewson Co., Inc.

Industrial Sound Control

Engineering Corp. of America
McDonald, B. F., Co.
Mine Safety Appliances Co.
Scott, H. H., Inc.
United States Gypsum Co.

Industrial Tapes

General Bandages, Inc.

Inhalators

Bomgardner Mfg. Co.
Boyer-Campbell Co.
Cycle-Flo Co.
Davis Emergency Equip. Co., Inc.
E & J Mfg. Co.
Emerson, J. H., Co.
General Scientific Equip. Co.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
National Equip. Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Scott Aviation Corp.
Stephenson Corp.

Insecticides

Associated Just Distributors, Inc.
Brulin & Co., Inc.
Diversey Corp.
Dolge, C. B., Co.
Dow Chemical Co.
DuPont E. I., de Nemours & Co., Inc.
Finnell System, Inc.
Huntington Laboratories, Inc.
Johnson, S. C., & Son, Inc.
McDonald, B. F., Co.
Monsanto Chemical Co.
National Disinfectant Co.
Rochester Safety Equip. Co., Inc.
United States Rubber Co.
West Chemical Products, Inc.
Worrell-Consolidated Laboratories

Insect Repellent

Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
Dolge, C. B., Co.
Halperin, A. E., Co., Inc.
McDonald, B. F., Co.
Medical Supply Co.
Mine Safety Appliances Co.
Rochester Safety Equip. Co., Inc.
West Chemical Products, Inc.
Worrell-Consolidated Laboratories

Insoles

Bullard, E. D., Co.
Gentex Corp.
Goodall Rubber Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Rochester Safety Equip. Co., Inc.

See directory of Safety Equipment Sources for addresses.

classified safety product index

Insulated Safety Links
Bullard, E. D., Co.

Insurance
Employers Mutual of Wausau

Intercommunication Equipment
Talk-A-Phone Company

Interlocks, Key Interchange
I-T-E Circuit Breaker Co.,
R & IE Equip. Div.

J

Jackets, Life, Industrial
Gentex Corp.

K

Keys, Safety Chuck
Lindstrom Mfg. Co., Inc.

Knives, Safety
Bashlin, W. M., Co.
Flash Mfg. Co.
Miller Equip. Co., Inc.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.

L

Labels, Adhesive
Brady, W. H., Co.
Fisher Scientific Co.
Ready Made Sign Co., Inc.
Rochester Safety Equip. Co., Inc.
Sohl Company
United States Rubber Co.
Western Lithograph Co.,
Westline Prod. Div.

Ladder Climbers
Babcock, W. W., Co., Inc.
Cleveland Ladder Co., Inc.
Rochester Safety Equip. Co., Inc.
Rose Mfg. Co.
Safety First Supply Co.

Ladder Shoes or Feet
Aluminum Ladder Co.
American Mason Safety Tread Co.
American Optical Co.
Babcock, W. W., Co., Inc.
Boyer-Campbell Co.
Chesebro-Whitman Mfg. Corp.
Cleveland Ladder Co., Inc.
Duo-Safety Ladder Corp.
Eden Enterprises, Inc.
General Scientific Equip. Co.
Industrial Prod. Co.
Johnson Ladder Shoe Co., Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mcliflex Products Co., Inc.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Patent Scaffolding Co., Inc.
Pulmosan Safety Equip. Corp.
Putnam Rolling Ladder Co., Inc.
Rochester Safety Equip. Co., Inc.
Rose Mfg. Co.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Standard Glove Co.
Standard Safety Equipment Co.

Ladders, Aluminum
Aluminum Ladder Co.
Aluminum Safety Prod. Inc.
Babcock, W. W., Co., Inc.
Ballymore Co.
Chesebro-Whitman Mfg. Corp.
Cleveland Ladder Co., Inc.
Duo-Safety Ladder Corp.
Eden Enterprises, Inc.
Patent Scaffolding Co., Inc.
Pulmosan Safety Equip. Corp.
Putnam Rolling Ladder Co., Inc.
Rochester Safety Equip. Co., Inc.
Rol-Away Truck Mfg. Co., Inc.
Safety First Supply Co.
Scientific Industrial Supply Co.

Ladder Rungs, Safety
Reliance Steel Prod. Co.

Ladders, Rolling
Ballymore Co.
Chesebro-Whitman Mfg. Corp.
Cleveland Ladder Co., Inc.
Cotterman, I. D.
Patent Scaffolding Co., Inc.
Putnam Rolling Ladder Co., Inc.
Rochester Safety Equip. Co., Inc.
Rol-Away Truck Mfg. Co., Inc.
Safe-Lad Mfg. Co.

Ladders, Safety
Aluminum Ladder Co.
Aluminum Safety Prod. Inc.
Babcock, W. W., Co., Inc.
Ballymore Co.
Chesebro-Whitman Mfg. Corp.
Cleveland Ladder Co., Inc.
Cotterman, I. D.
Duo-Safety Ladder Corp.
Eden Enterprises, Inc.
Fisher Scientific Co.
Patent Scaffolding Co., Inc.
Pulmosan Safety Equip. Corp.
Putnam Rolling Ladder Co., Inc.
Reliance Steel Prod. Co.
Rochester Safety Equip. Co., Inc.
Rol-Away Truck Mfg. Co., Inc.
Safe-Lad Mfg. Co.
Safety First Supply Co.
Safety Tower Ladder Co.

Ladders, Tower Safety
Aluminum Safety Prod. Inc.
Patent Scaffolding Co., Inc.
Rochester Safety Equip. Co., Inc.
Rol-Away Truck Mfg. Co., Inc.
Safety Tower Ladder Co.

Lamp Carriers
Pattern Products Co.

Lamp Guards
Browne, Stewart R., Mfg. Co., Inc.
Electric Cord Co.
Ericson Mfg. Co.
General Scientific Equip. Co.
Gets-A-Lite Co.
Industrial Prod. Co.
McGill Mfg. Co., Inc.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Standard Safety Equipment Co.

Lamp Hangers
New Jersey Safety Equip. Co.

Lamps, Adjustable
Karel First Aid Supply Co.
Luxo Lamp Corp.
Swiveller Co., Inc.

Lamps, Electric
Electric Cord Co.
Ericson Mfg. Co.
Karel First Aid Supply Co.
Luxo Lamp Corp.
McDonald, B. F., Co.
Swiveller Co., Inc.

Lamps, Emergency
American Optical Co.
Carpenter Mfg. Co.
Clean Sweep Co.
Electric Cord Co.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Rochester Safety Equip. Co., Inc.
Tedcar Products Co.
U-C-Lite Mfg. Co.

Lamps, Explosion Proof
Browne, Stewart R., Mfg. Co., Inc.
Carpenter Mfg. Co.
Electric Cord Co.
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
Pyle-National Co.
Rochester Safety Equip. Co., Inc.
U-C-Lite Mfg. Co.

Lamps, Extension
Browne, Stewart R., Mfg. Co., Inc.
Carpenter Mfg. Co.
Ericson Mfg. Co.
Industrial Prod. Co.
Luxo Lamp Corp.
McGill Mfg. Co., Inc.
New Jersey Safety Equip. Co.
Pyle-National Co.
Sittler Corp.
Swiveller Co., Inc.

Lamps, Miners'
Justrite Mfg. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
National Mine Service Co.
Rochester Safety Equip. Co., Inc.

Lamps, Portable Electric
Browne, Stewart R., Mfg. Co., Inc.
Carpenter Mfg. Co.
Clean Sweep Co.
Electric Cord Co.
Ericson Mfg. Co.
Industrial Prod. Co.
Justrite Mfg. Co.
Luxo Lamp Corp.
McDonald, B. F., Co.
McGill Mfg. Co., Inc.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pyle-National Co.
Rochester Safety Equip. Co., Inc.
Swiveller Co., Inc.
Tedcar Products Co.
U-C-Lite Mfg. Co.

Lamps, Safety
Browne, Stewart R., Mfg. Co., Inc.
Carpenter Mfg. Co.
Clean Sweep Co.
Davis Emergency Equip. Co., Inc.
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Swiveller Co., Inc.
Tedcar Products Co.

Lanterns, Carbide
Rochester Safety Equip. Co., Inc.

Lanterns, Electric
Carpenter Mfg. Co.
Dietz, R. E., Co.
Justrite Mfg. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
National Carbon Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
U-C-Lite Mfg. Co.

Lanyards
Bashlin, W. M., Co.
Buhrke, R. H., Co.
Miller Equip. Co., Inc.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Safety First Supply Co.

Leather Preserver, Water Repellent
Bashlin, W. M., Co.
Dow Corning Corp.
DuPont, E. I. de Nemours & Co., Inc.
Miller Equip. Co., Inc.
Rochester Safety Equip. Co., Inc.
Standard Glove Co.
Standard Safety Equipment Co.

Leather, Safety Clothing
Advance Glove Mfg. Co.
Aljay Mfg. Co., Inc.
Allied Glove Corp.
American Allsafe Co., Inc.
American Optical Co.
Associated Bag & Apron Co.
Boyer-Campbell Co.
Brossard, Lester L., Co.
Dunn Products
Gebhardt, A. L., Co.
General Scientific Equip. Co.
General Split Corp.
Holcomb Safety Garment Co.
Industrial Gloves Co.
Industrial Prod. Co.
Kennedy-Ingalls, Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Midwest Glove Co., Inc.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Pulmosan Safety Equip. Corp.
Racine Glove Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Seco Safety Products Co.
Standard Glove Co.
Standard Safety Equipment Co.
Wheeler Protective Apparel, Inc.

Leathers, Hand
Advance Glove Mfg. Co.
American Allsafe Co., Inc.
Boyer-Campbell Co.
Dunn Products
Gebhardt, A. L., Co.
General Scientific Equip. Co.
Holcomb Safety Garment Co.
Industrial Gloves Co.
Kennedy-Ingalls, Inc.
Kimball Safety Prod. Co.
Midwest Glove Co., Inc.
Mine Safety Appliances Co.
Olympic Glove Co., Inc.
Racine Glove Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Seco Safety Products Co.
Standard Safety Equipment Co.
Wheeler Protective Apparel, Inc.

Leggings
Advance Glove Mfg. Co.
American Allsafe Co., Inc.
American Optical Co.
Associated Bag & Apron Co.
Boyer-Campbell Co.
Dunn Products
Ellwood Safety Appliance Co.
Gebhardt, A. L., Co.
General Scientific Equip. Co.
Holcomb Safety Garment Co.
Industrial Gloves Co.
Industrial Prod. Co.
Kennedy-Ingalls, Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Pisco Safety Prod. Co.
Pulmosan Safety Equip. Corp.
Racine Glove Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Snyder, M. L., & Son, Inc.
Standard Glove Co.
Standard Safety Equipment Co.
Surety Rubber Co.
Wheeler Protective Apparel, Inc.

Lens Cleaner
Acme Protection Equip. Co.
American Optical Co.
Bausch & Lomb Optical Co.
Brossard, Lester L., Co.
Carboff Co.
Dow Corning Corp.
Eastern Safety Equip. Co.
Fendall Company
Fisher Scientific Co.
General Scientific Equip. Co.

To locate Advertisements, see Advertisers' Index.

Industrial Prod. Co.
Karel First Aid Supply Co.
Kimball Safety Prod. Co.
Lenscleam, Inc.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Silicone Paper Co. of America, Inc.
Standard Glove Co.
United States Safety Service Co.
Watchemoket Optical Co., Inc.
Wilkins Co., Inc.
Willson Products Div.

Lens, Industrial

American Industrial Safety Equip. Co., Inc.
American Optical Co.
Bausch & Lomb Optical Co.
Boyer-Campbell Co.
Dockson Corp.
Fibre-Metal Products Co.
General Scientific Equip. Co.
Glendale Optical Co., Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
Pioneer Scientific Corp.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Sellstrom Mfg. Co.
Standard Glove Co.
Standard Safety Equipment Co.
Titmus Optical Co.
United States Safety Service Co.
Welsh Mfg. Co.
Willson Products Div.

Lens Inspection

Bausch & Lomb Optical Co.
General Scientific Equip. Co.
Glendale Optical Co., Inc.
Safety First Supply Co.
Standard Glove Co.
Titmus Optical Co.
Willson Products Div.

Lens, Prescription

American Optical Co.
Bausch & Lomb Optical Co.
Chicago Eye Shield Co.
Fendall Company
Industrial Prod. Co.
Kimball Safety Prod. Co.
Pioneer Scientific Corp.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Sellstrom Mfg. Co.
Standard Glove Co.
Titmus Optical Co.
United States Safety Service Co.
Welsh Mfg. Co.
Willson Products Div.

Lifeline Lock for Scaffolding, Swings

Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Safety Tower Ladder Co.

Lifters, Vacuum

Boyer-Campbell Co.
General Scientific Equip. Co.
Industrial Prod. Co.
Littell, F. J., Machine Co., Vac-U-Mation Div.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Searjeant Metal Products, Inc.

Lifting Equipment, Industrial

Ballymore Co.
Economy Engineering Co.
Hawkeye Products Corp.
Industrial Prod. Co.
Merrill Brothers, Inc.
Montgomery & Co., Inc.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
West Bend Equip. Corp.

Lighting, Outdoor

Crouse-Hinds Co.
Pyle-National Co.
Swivelier Co., Inc.

Lighting Units, Portable

Carpenter Mfg. Co.
Clean Sweep Co.
Crouse-Hinds Co.
Dietz, R. E., Co.
Electric Cord Co.
Electric Storage Battery Co., Exide Industrial Div.
Luxo Lamp Corp.
McGill Mfg. Co., Inc.
Mine Safety Appliances Co.
Nickel Cadmium Battery Corp.
Rochester Safety Equip. Co., Inc.
Snyder, M. L., & Son, Inc.
Swivelier Co., Inc.
Tedcar Products Co.
U-C-Lite Mfg. Co.

Lights Emergency, Battery

American Optical Co.
Browne, Stewart R., Mfg. Co., Inc.
Carpenter Mfg. Co.
Clean Sweep Co.
Crouse-Hinds Co.
Dietz, R. E., Co.
Electric Cord Co.
Electric Storage Battery Co., Exide Industrial Div.
Emarco Corp.
General Scientific Equip. Co.
Gould-National Batteries, Nicad Div., Inc.
Justrite Mfg. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Nickel Cadmium Battery Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Snyder, M. L., & Son, Inc.
Tedcar Products Co.
U-C-Lite Mfg. Co.

Lights, Emergency Vehicle

Carpenter Mfg. Co.
Dietz, R. E., Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Tedcar Products Co.
U-C-Lite Mfg. Co.
Vari-Products Company

Lights, Warning

Browne, Stewart R., Mfg. Co., Inc.
Carpenter Mfg. Co.
Crouse-Hinds Co.
Dietz, R. E., Co.
Edwards Co., Inc.
Emarco Corp.
Federal Sign and Signal Corp.
General Scientific Equip. Co.
Justrite Mfg. Co.
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
Pyle-National Co.
Ready Made Sign Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Tedcar Products Co.
Traffic Equip. Corp.
U-C-Lite Mfg. Co.
Vari-Products Company

Line Construction Equipment & Tools

Petersen Engineering Co., Inc.

Line Markers

Boyer-Campbell Co.
Brady, W. H., Co.
Industrial Prod. Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Western Lithograph Co., Westline Prod. Div.

Linemen's Bags

Re-Mar Prods. Corp.

Linemen's Rubber Protective Devices

Bashlin, W. M., Co.
Goodall Rubber Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Olympic Glove Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Salisbury, W. H., & Co.
Sawyer-Tower, Inc.
Snyder, M. L., & Son, Inc.

Load Binders

American Hoist & Derrick Co.
American Logging Tool Corp.
Canton Mfg. Co.
Newco Mfg. Co., Inc.

Lockers and Hangers for Clothing

Safety First Supply Co.

Lock-Outs, Electric Switch

General Scientific Equip. Co.
Industrial Prod. Co.
New Jersey Safety Equip. Co.
Osborn Mfg. Co.
Rochester Safety Equip. Co., Inc.
Searjeant Metal Products, Inc.
Standard Glove Co.

M

Magnifiers

Bausch & Lomb Optical Co.
Boyer-Campbell Co.
Custanite Corp.
Edroy Products Co.
Fisher Scientific Co.
General Scientific Equip. Co.
Industrial Prod. Co.
Karel First Aid Supply Co.
Montgomery & Co., Inc.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.

Maintenance Towers

Bil-Jax, Inc.

Manhole Guard Covers, Plastic

Plastimayd Prod. Corp.

Markers, Traffic Line

Brady, W. H., Co.
Brossard, Lester L., Co.
Industrial Prod. Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Sohl Company

Masks, Abrasive Blasting

American Industrial Safety Equip. Co., Inc.
Boyer-Campbell Co.
Bullard, E. D., Co.
Fibre-Metal Prod. Co.
General Scientific Equip. Co.
Industrial Gloves Co.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Olympic Glove Co., Inc.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Wheeler Protective Apparel, Inc.

Masks, Acid Gas

Acme Protection Equip. Co.
Boyer-Campbell Co.
Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
General Scientific Equip. Co.
Industrial Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Sawyer-Tower, Inc.
Standard Safety Equipment Co.
Willson Products Div.

Masks, All-Service

Acme Protection Equip. Co.
American LaFrance Corp.
Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
Fyr-Fyter Co.
General Scientific Equip. Co.
Glendale Optical Co., Inc.
Industrial Gloves Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Standard Safety Equipment Co.
Willson Products Div.

Masks, Ammonia Gas

Acme Protection Equip. Co.
Boyer-Campbell Co.
Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
General Scientific Equip. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Sawyer-Tower, Inc.
Standard Safety Equipment Co.
Willson Products Div.

Masks, Babbitting

Boyer-Campbell Co.
Fibre-Metal Prod. Co.
General Scientific Equip. Co.
Industrial Prod. Co.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Willson Products Div.

Masks, Carbon Monoxide

Acme Protection Equip. Co.
Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
General Scientific Equip. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Sawyer-Tower, Inc.
Standard Safety Equipment Co.
Willson Products Div.

Masks, Gas, Welding

Acme Protection Equip. Co.

Masks, Hose (Fresh Air)

Acme Protection Equip. Co.
American LaFrance Corp.
Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.

See directory of Safety Equipment Sources for addresses.

Sawyer-Tower, Inc.
Standard Safety Equipment Co.
Union Industrial Equip. Corp.
Willson Products Div.

Masks, Hose (Supplied Air)

Acme Protection Equip. Co.
American LaFrance Corp.
Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
Fibre-Metal Prod. Co.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Sawyer-Tower, Inc.
Scott Aviation Corp.
Standard Safety Equipment Co.
Union Industrial Equip. Corp.

Masks, Organic Vapor

Acme Protection Equip. Co.
Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
General Scientific Equip. Co.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Sawyer-Tower, Inc.
Union Industrial Equip. Corp.
Willson Products Div.

Matches, Safety

Hornik, Frederick
Universal Match Corp.

Materials Handling Devices

Bullard, E. D., Co.
Custanite Corp.
Dillon, W. C., & Co., Inc.
Engineering Corp. of America
Falcon Alarm Co., Inc.
Hamilton Tool Co.
Hawkeye Products Corp.
Link-Belt Co.
Maglino Inc.
Merrill Brothers, Inc.
Montgomery & Co., Inc.
Morse Mfg. Co., Inc.
New Jersey Safety Equip. Co.
Raymond Corp.
Renfroe, J. C., & Sons, Inc.
Rochester Safety Equip. Co., Inc.
Rol-Away Truck Mfg. Co., Inc.

Mats, Standing

Boyer-Campbell Co.
Brabrook, A. N., Inc.
General Scientific Equip. Co.
Goodall Rubber Co.
Industrial Prod. Co.
Meiflex Products Co., Inc.
Moor, D. W., Co.
Rochester Safety Equip. Co., Inc.
Snyder, M. L., & Son, Inc.
Superior Rubber Mfg. Co.
United States Rubber Co.
Wear Proof Mat Co.

Mats, Switchboard

Boyer-Campbell Co.
Brabrook, A. N., Inc.
Goodall Rubber Co.
Meiflex Products Co., Inc.
Moor, D. W., Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Salisbury, W. H., & Co.
Snyder, M. L., & Son, Inc.
United States Rubber Co.
Wear Proof Mat Co.

Matting, Floor and Stair

Boyer-Campbell Co.
Brabrook, A. N., Inc.
Emerson, J. H., Co.
Goodall Rubber Co.
Gro-Cord Rubber Co.
Meiflex Products Co., Inc.
Moor, D. W., Co.
Rochester Safety Equip. Co., Inc.
Scientific Industrial Supply Co.
Searjeant Metal Products, Inc.
Snyder, M. L., & Son, Inc.
Superior Rubber Mfg. Co.
United States Rubber Co.
Wear Proof Mat Co.

Mauls, Rubber

Goodall Rubber Co.
Johnson Ladder Shoe Co., Inc.
New Plastic Corp.
Snyder, M. L., & Son, Inc.

Maul, Steel

Johnson Ladder Shoe Co., Inc.

Mauls, Wood

New Plastic Corp.

Message Repeater

Mine Safety Appliances Co.

Metal Mesh Gloves & Aprons

Allied Glove Corp.

Meter, Sound-Survey

McDonald, B. F., Co.
Mine Safety Appliances Co.
Scott, H. H., Inc.

Mirrors, Plant Traffic

Boyer-Campbell Co.
Brossard, Lester L., Co.
Engineering Corp. of America
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Scientific Industrial Supply Co.
Searjeant Metal Products, Inc.
Silver, Fred, & Co.

Mobile First Aid Equipment

Bomgardner Mfg. Co.
Karel First Aid Supply Co.
McDonald, B. F., Co.

Mop Trucks

Finnell System, Inc.
Masury-Young Co.

Movers, Railway Car

American Logging Tool Corp.
Link-Belt Co.
New Jersey Safety Equip. Co.
Standard Safety Equipment Co.

N

Nets, Rope Safety

Bullard, E. D., Co.
Rochester Safety Equip. Co., Inc.
Rose Mfg. Co.
Safety First Supply Co.

Noise Control

Allied Witan Co.
American Machine & Metals, Inc., DeBothezat Fans Div.
American Optical Co.
Bemis Bros. Bag Co., TransWall Coated Prod.
Engineering Corp. of America
Hansson, Elof, Inc.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Noise Control
Rysdon Products Co., Noise Control Div.
Scott, H. H., Inc.
United States Gypsum Co.

Non Sparking Tools

Ampco Metal, Inc.
Beryllium Corp.
Boyer-Campbell Co.
Custanite Corp.
Frontier Bronze Corp.
Ingersoll-Rand Co.
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
New Plastic Corp.
Rochester Safety Equip. Co., Inc.
Rose Mfg. Co.
Scientific Industrial Supply Co.

Nozzles

Engineering Corp. of America
Link-Belt Co.
National Foam System, Inc.
Rochester Safety Equip. Co., Inc.
Rockwood Sprinkler Co.
Safety First Supply Co.
Seco Safety Products Co.
Snyder, M. L., & Son, Inc.
Tokheim Corp.

O

Overload, Cut-Offs

Dillon, W. C., & Co., Inc.

Overshoes, Neoprene, Non-Slip

Tingley Rubber Corp.

Overshoes, Rubber, Non-Slip

Tingley Rubber Corp.

Oxygen Breathing Apparatus

Acme Protection Equip. Co.
Bomgardner Mfg. Co.
Cycle-Flo Co.
Davis Emergency Equip. Co., Inc.
E & J Mfg. Co.
Fyr-Fyter Co.
General Scientific Equip. Co.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
National Equip. Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

Oxygen Recorders

McDonald, B. F., Co.
Mine Safety Appliances Co.

Oxygen Therapy Apparatus

Bomgardner Mfg. Co.
Cycle-Flo Co.
E & J Mfg. Co.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
National Equip. Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Scott Aviation Corp.

P

Pacs, Miners

Lehigh Safety Shoe Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Record Industrial Co.
Snyder, M. L., & Son, Inc.
Standard Glove Co.

Padlocks

Master Lock Co.

Pads, Knee

Advance Glove Mfg. Co.
Ellwood Safety Appliance Co.
General Scientific Equip. Co.
Holcomb Safety Garment Co.
Industrial Gloves Co.
Kennedy-Ingalls, Inc.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Plasco Safety Prod. Co.
Pulmosan Safety Equip. Corp.
Racine Glove Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Scientific Industrial Supply Co.
Snyder, M. L., & Son, Inc.
Standard Glove Co.
Standard Safety Equipment Co.
Wheeler Protective Apparel, Inc.

Paint, Abrasive Resurfacing

American Abrasive Metals Co.
DuPont, E. I. de Nemours & Co., Inc.
Frost Paint & Oil Corp.
Kelley Paint Co.
Legge, Walter G., Co., Inc.
Magnus Chemical Co., Inc.
McDonald, B. F., Co.
Miracle Adhesives Corp.
New Jersey Safety Equip. Co.
Oil-Dri Corp. of America
Pittsburgh Plate Glass Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

Paint, Fire Resistant

DuPont, E. I. de Nemours & Co., Inc.
Flamort Chemical Co.
Kelly Paint Co.
McDonald, B. F., Co.
Pittsburgh Plate Glass Co.
Rochester Safety Equip. Co., Inc.

Paint, Luminous and Fluorescent

Lawter Chemicals, Inc.

Partitions

Globe Co.

Partitions, Rolling

Bemis Bros. Bag Co., TransWall Coated Prod.
Frommelt Industries

Parts, Cleaning Equipment

Magnus Chemical Co., Inc.
Moore, John B., Corp.
Packwood, G. H., Mfg. Co.
Practical Mfg. Co.
Protectoseal Co.
Rochester Safety Equip. Co., Inc.
Teet, Inc.

Pins, Service Award

House of Williams

Pipe Markers

Boyer-Campbell Co.
Brady, W. H., Co.
Engineering Corp. of America
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Ready Made Sign Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Sohl Company
Standard Safety Equipment Co.
Western Lithograph Co. Westline Prod. Div.

Plaques, Safety

House of Williams
Williams Jewelry & Mfg. Co.

Plastics for Shields and Guards

Boyer-Campbell Co.
DuPont, E. I., de Nemours & Co., Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Pioneer Scientific Corp.
Rochester Safety Equip. Co., Inc.
Searjeant Metal Products, Inc.
Standard Safety Equipment Co.
Tedcar Products Co.
Wasco Products, Inc.

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classified safety product index

Platforms, Scaffold
Aluminum Safety Prod. Inc.
Bil-Jax, Inc.
Chesebro-Whitman Mfg. Corp.
Economy Engineering Co.
Patent Scaffolding Co., Inc.
Rochester Safety Equip. Co., Inc.

Platforms, Steel
Ballymore Co.
Bil-Jax, Inc.
Bustin Steel Products, Inc.
Inland Steel Co.
Nichols Engineering Co.
Reliance Steel Prod. Co.
Rochester Safety Equip. Co., Inc.

Platforms, Unloading
Magline Inc.
Montgomery & Co., Inc.
New Jersey Safety Equip. Co.
Nichols Engineering Co.

Poison Ivy Treatments
Boyer-Campbell Co.
Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
Halperin, A. E., Co., Inc.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Medical Supply Co.
Mine Safety Appliances Co.
Pac-Kit Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

Pole Grip, Safety
Cleveland Ladder Co., Inc.
General Scientific Equip. Co.
New Jersey Safety Equip. Co.
Petersen Engineering Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Standard Safety Equipment Co.

Poster Service
Elliott Service Co., Inc.
Lehigh Safety Shoe Co.
National Safety Council

Power Machine, Electric Control
Micro Switch, Div. of
Minneapolis-Honeywell Reg. Co.

Power Press Safety Controls Kits
Rochester Safety Equip. Co., Inc.
Safeguard Mfg. Co.
Schrader's, A., Son,
Div. of Scovill Mfg. Co., Inc.
Searjeant Metal Products, Inc.

Projector, Automatic and Continuous
American Optical Co.
DuKane Corp.
Eastman Kodak Co.
Keystone View Co.

Projectors, Film Strip
American Optical Co.
DuKane Corp.
Eastman Kodak Co.
Keystone View Co.

Projectors, Motion Picture
Eastman Kodak Co.
Keystone View Co.

Projectors, Sound Slidefilm
DuKane Corp.
Keystone View Co.

Promotional Material, Safety
Hornik, Frederick
Keystone View Co.
National Safety Council
Protectoseal Co.
Reinhold Publishing Co.

Protectors, Arm
Advance Glove Mfg. Co.
American Optical Co.
Boyer-Campbell Co.
Holcomb Safety Garment Co.
Kennedy-Ingalls, Inc.
Keystone View Co.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Racine Glove Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Standard Glove Co.
Standard Safety Equipment Co.
Wheeler Protective Apparel, Inc.

Protectors, Ear
Advance Glove Mfg. Co.
American Optical Co.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety Ear Protector Co.
Sigma Engineering Co.
Standard Safety Equipment Co.
Wheeler Protective Apparel, Inc.

Protectors, Finger
Advance Glove Mfg. Co.
Allied Glove Corp.
American Optical Co.
Dunn Products
Holcomb Safety Garment Co.
Kennedy-Ingalls, Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Pulmosan Safety Equip. Corp.
Record Industrial Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Searjeant Metal Products, Inc.
Standard Glove Co.
Standard Safety Equipment Co.
Wheeler Protective Apparel, Inc.

Protectors for Linemen
Advance Glove Mfg. Co.
American Optical Co.
Bashlin, W. M., Co.
Dunn Products
McDonald, B. F., Co.
Mine Safety Appliances Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Salisbury, W. H., & Co.
Snyder, M. L., & Son, Inc.
Standard Glove Co.
Wheeler Protective Apparel, Inc.

Protectors, Knee
Advance Glove Mfg. Co.
Dunn Products
Holcomb Safety Garment Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Snyder, M. L., & Son, Inc.
Standard Glove Co.
Standard Safety Equipment Co.
Wheeler Protective Apparel, Inc.

Protector's Wire Rope
Bashlin, W. M., Co.

Publications, Safety
Loss Control Associates
Noise Control

Pumps, Acid
Buffalo Forge Co.
Engineering Corp. of America
Fisher Scientific Co.
General Scientific Equip. Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Snyder, M. L., & Son, Inc.
Standard Safety Equipment Co.

Pumps, Foam
Cardox Corp.
Fyr-Fyter Co.
Rochester Safety Equip. Co., Inc.
Snyder, M. L., & Son, Inc.

Pumps, Hand Operated
Acme Protection Equip. Co.
Blackmer Pump Co.
Engineering Corp. of America
General Scientific Equip. Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Tokheim Corp.

Pumps, Oxygen
Karel First Aid Supply Co.
McDonald, B. F., Co.

R

Racks, Barrel
Bethlehem Steel Co.
Industrial Prod. Co.
Morse Mfg. Co., Inc.
Rochester Safety Equip. Co., Inc.
West Bend Equip. Corp.

Racks, Fire Hose
Circul-Air Corp.

Rail Punch
Mine Safety Appliances Co.

Ramps and Runways
Magline Inc.

Reducers, Speed
Link-Belt Co.

Reels, Welding Hose
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
United Specialties, Inc.

Reels, Wire
Ericson Mfg. Co.
Industrial Prod. Co.

Reflectors, Lamp
Prairie State Prod. Co.
Ready Made Sign Co., Inc.
Rochester Safety Equip. Co., Inc.
Tedcar Products Co.

Refueling Controls
Hewson Co., Inc.

Regulators, Gas
Cycle-Flo Co.
Dockson Corp.

Rescue Apparatus, Diving and Underwater
McDonald, B. F., Co.
National Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

Rescue Suits
Advance Glove Mfg. Co.
Fyrepel Prod. Inc.
Mine Safety Appliances Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Union Industrial Equip. Corp.
Wheeler Protective Apparel, Inc.

Respirators, Air-Line
Acme Protection Equip. Co.
American Optical Co.
Boyer-Campbell Co.
Chicago Eye Shield Co.
General Scientific Equip. Co.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Scott Aviation Corp.
Standard Safety Equipment Co.
Willson Products Div.

Respirators, Dust—Type A
American Optical Co.
Boyer-Campbell Co.
Brossard, Lester L., Co.
Bullard, E. D., Co.
Chicago Eye Shield Co.
Cover, H. S.
DeVilbiss Co.
Dunn Products
General Scientific Equip. Co.
Glendale Optical Co., Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
McDowell Mfg. Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Scientific Industrial Supply Co.
Searjeant Metal Products, Inc.
Sellstrom Mfg. Co.
Standard Safety Equipment Co.
Willson Products Div.

Respirators, Dust—Type A and Lead-Combination
American Optical Co.
Boyer-Campbell Co.
Chicago Eye Shield Co.
Cover, H. S.
Dunn Products
General Scientific Equip. Co.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Scientific Industrial Supply Co.
Standard Safety Equipment Co.
Willson Products Div.

Respirators, Dust—Lead
American Optical Co.
Boyer-Campbell Co.
Brossard, Lester L., Co.
Bullard, E. D., Co.
Chicago Eye Shield Co.
Dunn Products
General Scientific Equip. Co.
Glendale Optical Co., Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Scientific Industrial Supply Co.
Standard Safety Equipment Co.
Willson Products Div.

Respirators, Fume
American Optical Co.
Boyer-Campbell Co.
Dunn Products
General Scientific Equip. Co.
Karel First Aid Supply Co.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
McDowell Mfg. Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Sellstrom Mfg. Co.

See directory of Safety Equipment Sources for addresses.

Standard Safety Equipment Co.
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Respirators, Gas

American Optical Co.
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Chicago Eye Shield Co.
General Scientific Equip. Co.
Karel First Aid Supply Co.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Standard Safety Equipment Co.
Willson Products Div.

Respirators, Mists

American Optical Co.
Boyer-Campbell Co.
DeVilbiss Co.
Dunn Products
General Scientific Equip. Co.
Kimball Safety Prod. Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Sellstrom Mfg. Co.
Standard Safety Equipment Co.
Willson Products Div.

Resuscitation Equipment

Bomgardner Mfg. Co.
Boyer-Campbell Co.
Cycle-Flo Co.
Davis Emergency Equip. Co., Inc.
E & J Mfg. Co.
Emerson, J. H., Co.
Fyr-Fyter Co.
General Scientific Equip. Co.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Medical Supply Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Stephenson Corp.

Rock Dusters

McDonald, B. F., Co.
Mine Safety Appliances Co.

Rope, Barrier (Plastic)

Industrial Prod. Co.

Rope Grab, Life Line

American Ailsafe Co., Inc.
Cleveland Ladder Co., Inc.
General Scientific Equip. Co.
Macwhyte Co.
Rochester Safety Equip. Co., Inc.
Rose Mfg. Co.
Safety First Supply Co.
Standard Safety Equipment Co.

Rope, Wire

American Chain & Cable Co., Inc.
Bethlehem Steel Co.
Broderick & Bascom Rope Co.
Buhrke, R. H., Co.
Jones & Laughlin Steel Corp.
Lowery Brothers, Inc.
Macwhyte Co.
Miller Equip. Co., Inc.
Roebling's John A., Sons Corp.
Union Wire Rope Corp.
Wickwire-Spencer Steel Div., Colorado Fuel & Iron Corp.
Wire Rope Corp. of America

Rupture Discs

Black, Sivalls & Bryson, Inc.

S

Safety Crutch Tips

Safety First Supply Co.

Safety Device, Tower Ladders

Eden Enterprises, Inc.
Engineering Corp. of America
Rochester Safety Equip. Co., Inc.
Safety Tower Ladder Co.

Safetygraphs

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Engineering Corp. of America
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Safety Heads

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Safety Hooks

American Hoist & Derrick Co.
Bashlin, W. M., Co.
Buhrke, R. H., Co.
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McDonald, B. F., Co.
Miller Equip. Co., Inc.
Newco Mfg. Co., Inc.
New Jersey Safety Equip. Co.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Taylor, S. G., Chain Co., Inc.

Safety Ohmeter

Hewson Co., Inc.

Safety Steps

Globe Company

Safety Training

Loss Control Associates
National Safety Council
Universal Match Corp.

Safety Truck Steps

American Abrasives Metals Co.
Bullard, E. D., Co.
Rol-Away Truck Mfg. Co., Inc.
Safety First Supply Co.

Salt Tablets

Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
General Scientific Equip. Co.
Halperin, A. E., Co., Inc.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Medical Supply Co.
Mine Safety Appliances Co.
Morton Salt Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Standard Safety Equipment Co.
United States Safety Service Co.

Salt Tablet Dispenser

Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
General Scientific Equip. Co.
Halperin, A. E., Co., Inc.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Medical Supply Co.
Mine Safety Appliances Co.
Morton Salt Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Standard Safety Equipment Co.
United States Safety Service Co.

Sandals, Non-Skid

Associated Bag & Apron Co.
Boyer-Campbell Co.
General Scientific Equip. Co.
McDonald, B. F., Co.
Record Industrial Co.
Reece Wooden Sole Shoe Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Snyder, M. L., & Son, Inc.
Standard Safety Equipment Co.

Sandals, Shower

Associated Bag & Apron Co.
Boyer-Campbell Co.
General Scientific Equip. Co.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
Record Industrial Co.
Reece Wooden Sole Shoe Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Scientific Industrial Supply Co.
Snyder, M. L., & Son, Inc.
Standard Glove Co.

Sandals, Wooden Sole

Boyer-Campbell Co.
Gebhardt, A. L., Co.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Record Industrial Co.
Reece Wooden Sole Shoe Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Snyder, M. L., & Son, Inc.
Standard Glove Co.
Standard Safety Equipment Co.

Sand Blast Equipment

Bullard, E. D., Co.
Industrial Gloves Co.
McDonald, B. F., Co.
Paugborn Corp.
Rochester Safety Equip. Co., Inc.
Ruemelin Mfg. Co.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Snyder, M. L., & Son, Inc.
Standard Safety Equipment Co.
United States Rubber Co.

Scaffold, Jacks

Bil-Jax, Inc.
Patent Scaffolding Co., Inc.
Steel Scaffolding Co., Inc.

Scaffolding, Rolling

Aluminum Safety Prod. Inc.
Amidon Engineering Co.
Atlas Industrial Corp.
Bil-Jax, Inc.
Economy Engineering Co.
Patent Scaffolding Co., Inc.
Steel Scaffolding Co., Inc.
Up-Right Scaffolds

Scaffolding, Safety

Aluminum Safety Prod. Inc.
Amidon Engineering Co.
Atlas Industrial Corp.
Bil-Jax, Inc.
Economy Engineering Co.
Patent Scaffolding Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Steel Scaffolding Co., Inc.
Up-Right Scaffolds

Scrubbing Machines, Floor

Brulin & Co., Inc.
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Finnell System, Inc.
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Huntington Laboratories, Inc.
Johnson, S. C., & Son, Inc.
Masury-Young Co.
Multi-Clean Prod., Inc.
Nobles Engineering & Mfg. Co.

Searchlights

Rochester Safety Equip. Co., Inc.

Self-Rescuers for Miners

McDonald, B. F., Co.
Mine Safety Appliances Co.

Sheet Lifters, Vacuum

Boyer-Campbell Co.
Hamilton Tool Co.
Industrial Prod. Co.
Littell, F. J., Machine Co., Vac-U-Mation Div.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Standard Glove Co.

Shield, Welding

American Optical Co.
Boyer-Campbell Co.
Chicago Eye Shield Co.
Dockson Corp.
Fibre-Metal Prod. Co.
Frommelt Industries
General Scientific Equip. Co.
Industrial Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Sellstrom Mfg. Co.
Singer Glove Mfg. Co.
Standard Glove Co.
Wheeler Protective Apparel, Inc.
Willson Products Div.

Shields, Valve

Industrial Prod. Co.

Shirts, Anatomical

Mine Safety Appliances Co.
Rochester Safety Equip. Co., Inc.
Wheeler Protective Apparel, Inc.

Shock-Proof Steering Wheels for Lift Trucks

Kosch Co.

Shoe Preserver, Water Repellent

Boyer-Campbell Co.
Dow Corning Corp.
DuPont, E. I., de Nemours & Co., Inc.
Rochester Safety Equip. Co., Inc.
Standard Glove Co.
Standard Safety Equipment Co.

Shoes, Conductive

Conductive Hospital Accessories Corp.
General Shoe Corp., Cedar Crest Shoe Co. Div.
Hy-Test Safety Shoes Div. International Shoe Co.
Legge, Walter G., Co., Inc.
Lehigh Safety Shoe Co.
McAn, Thom, Safety Shoe Div.
Safety First Shoe Co., Inc.

Shoes, Leather, Linemen's

Bashlin, W. M., Co.
Bone Dry Shoe Mfg. Co.
Gebhardt, A. L., Co.
General Shoe Corp., Cedar Crest Shoe Co. Div.
Hy-Test Safety Shoes Div. International Shoe Co.
Lehigh Safety Shoe Co.
Olympic Glove Co., Inc.
Record Industrial Co.
Wolverine Shoe & Tanning Corp.

Shoes, Non-Sparking

General Shoe Corp., Cedar Crest Shoe Co. Div.
Hy-Test Safety Shoes Div., International Shoe Co.
Iron Age Safety Shoe Div., H. Childs & Co., Inc.
Lehigh Safety Shoe Co.
McAn, Thom, Safety Shoe Div.
New Jersey Safety Equip. Co.
Record Industrial Co.
Safety First Shoe Co., Inc.

Shoes, Orthopedic, Wooden Sole

Gebhardt, A. L., Co.
Karel First Aid Supply Co.

To locate Advertisements, see Advertisers' Index.

New Jersey Safety Equip. Co.
Record Industrial Co.
Reece Wooden Sole Shoe Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.

Shoes, Rubber, Safety Toe

Advance Glove Mfg. Co.
Dunn Products
Goodall Rubber Co.
Iron Age Safety Shoe Div., H. Childs & Co., Inc.
Lehigh Safety Shoe Co.
Olympic Glove Co., Inc.
Record Industrial Co.
Rochester Safety Equip. Co., Inc.
Scientific Industrial Supply Co.
Snyder, M. L., & Son, Inc.
Standard Glove Co.

Shoes, Safety Toe

American Allsafe Co., Inc.
Bone Dry Shoe Mfg. Co.
Bronson Shoe Co.
General Shoe Corp., Cedar Crest Shoe Co. Div.
Goodall Rubber Co.
Haus of Krause
Hy-Test Safety Shoes Div., International Shoe Co.
Iron Age Safety Shoe Div., H. Childs & Co., Inc.
Lehigh Safety Shoe Co.
McAn, Thom, Safety Shoe Div.
Olympic Glove Co., Inc.
Record Industrial Co.
Reece Wooden Sole Shoe Co.
Rochester Safety Equip. Co., Inc.
Safety First Shoe Co., Inc.
Wolf, Harry J., Shoe Co.
Wolverine Shoe & Tanning Corp.

Shoes for Women

Hy-Test Safety Shoes Div. International Shoe Co.
Iron Age Safety Shoe Div., H. Childs & Co., Inc.
Lehigh Safety Shoe Co.
McAn, Thom, Safety Shoe Div.
Record Industrial Co.
Rochester Safety Equip. Co., Inc.
United States Rubber Co.

Shoes, Wooden Sole

Gebhardt, A. L., Co.
Karel First Aid Supply Co.
Kimball Safety Prod. Co.
New Jersey Safety Equip. Co.
Record Industrial Co.
Reece Wooden Sole Shoe Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Scientific Industrial Supply Co.
Snyder, M. L., & Sons, Inc.
Standard Glove Co.
Standard Safety Equipment Co.

Shower Baths, Industrial

Bradley Washfountain Co.
Haws Drinking Faucet Co.
New Jersey Safety Equip. Co.
Powers Regulator Co.
Safety Clothing & Equip. Co.
Speakman Co.

Shower, Emergency

Benson and Assoc.
Central Safety Equip. Co.
Engineering Corp. of America
Fisher Scientific Co.
General Scientific Equip. Co.
Haws Drinking Faucet Co.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Morland Associates
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Speakman Co.
Standard Glove Co.

Showers, Laboratory

Speakman Co.

Signals, Highway Warning

Canisteo Sign Mfg. Co., Inc.
Crouse-Hinds Co.
Davis Emergency Equip. Co., Inc.
Dietz, R. E., Co.
Eastern Metal of Elmira, Inc.
Emarco Corp.
Falcon Alarm Co., Inc.
Federal Sign and Signal Corp.
Industrial Prod. Co.
McDonald, B. F., Co.
Ready Made Sign Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Tedcar Products Co.
Vari-Products Company

Signs, Accident Prevention

Boyer-Campbell Co.
Brady, W. H., Co.
Brossard, Lester L., Co.
Canisteo Sign Mfg. Co., Inc.
Eastern Metal of Elmira, Inc.
Embossograf Corp. of America
General Scientific Equip. Co.
Industrial Prod. Co.
McDonald, B. F., Co.
M-M-A, Inc.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Prairie State Prod. Co.
Ready Made Sign Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Sohi Company
Standard Safety Equipment Co.
Standard Signs, Inc.
Stonehouse Signs, Inc.
Tedcar Products Co.
Traffic Equip. Corp.
Wagner Sign Service, Inc.
Western Lithograph Co., Westline Prod. Div.

Signs, Reflecting

Canisteo Sign Mfg. Co., Inc.
Eastern Metal of Elmira, Inc.
Industrial Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Minnesota Mining & Mfg. Co.
New Jersey Safety Equip. Co.
Prairie State Prod. Co.
Ready Made Sign Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Sohi Company
Standard Safety Equipment Co.
Standard Signs, Inc.
Stonehouse Signs, Inc.
Tedcar Products Co.
Traffic Equip. Corp.
Watchemoket Optical Co., Inc.
Western Lithograph Co., Westline Prod. Div.

Sirens and Signals

Edwards Co., Inc.
Falcon Alarm Co., Inc.
Federal Sign and Signal Corp.
Fyr-Fyter Co.
The Gamewell Co.
New Jersey Safety Equip. Co.
Notifier Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

Skull Caps

Associated Bag & Apron Co.
Boyer-Campbell Co.
Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
General Scientific Equip. Co.
Industrial Gloves Co.
Kennedy-Ingalls, Inc.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Racine Glove Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Scientific Industrial Supply Co.

Sleeves, Linemen's Rubber

Charleston Rubber Co.
Dunn Products
General Scientific Equip. Co.
Goodall Rubber Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Record Industrial Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Salisbury, W. H., & Co.
Scientific Industrial Supply Co.
Searjeant Metal Products, Inc.
Snyder, M. L., & Son, Inc.
Standard Glove Co.

Sleeves, Protective

Advance Glove Mfg. Co.
Aljay Mfg. Co., Inc.
American Allsafe Co., Inc.
American Optical Co.
Associated Bag & Apron Co.
Boyer-Campbell Co.
Dunn Products
Erell Mfg. Co.
General Scientific Equip. Co.
Goodall Rubber Co.
Halperin, A. E., Co., Inc.
Holcomb Safety Garment Co.
Industrial Gloves Co.
Industrial Prod. Co.
Jomac, Inc.
Kennedy-Ingalls, Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Milburn Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Olympic Glove Co., Inc.
Plasco Safety Prod. Co.
Pulmosan Safety Equip. Corp.
Racine Glove Co., Inc.
Record Industrial Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Sawyer-Tower, Inc.
Scientific Industrial Supply Co.
Searjeant Metal Products, Inc.
Seco Safety Products Co.
Standard Glove Co.
Standard Safety Equipment Co.
United States Rubber Co.
West Chemical Products, Inc.
Wheeler Protective Apparel, Inc.

Slings, Chain

American Chain Div., American Chain & Cable Co., Inc.
Columbus McKinnon Chain Corp.
Taylor, S. G., Chain Co., Inc.

Sling Protectors

Bashlin, W. M., Co.
Union Wire Rope Corp.

Slings, Wire Rope

American Chain & Cable Co., Inc.
Bethlehem Steel Co.
Broderick & Bascom Rope Co.
Buhrke, R. H., Co.
Bullard, E. D., Co.
Jones & Laughlin Steel Corp.
Lowery Brothers, Inc.
Macwhyte Co.
Roebling's, John A., Sons Corp.
Union Wire Rope Corp.
Wickwire-Spencer Steel Div., Colorado Fuel & Iron Corp.
Wire Rope Corp. of America

Slings, Woven Wire

Cambridge Wire Cloth Co.

Smoker's Stand

Protectoseal Co.
Rochester Safety Equip. Co., Inc.
Searjeant Metal Products, Inc.
Standard Industrial Products Company

Soaps or Cleaners, Hand

Associated Just Distributors, Inc.
Banite Co.
Breck, John H., Inc.
Brulin & Co., Inc.
Chemical Corp.
Dameron Enterprises, Inc.
Dolge, C. B., Co.
Finnell System, Inc.
Hillyard Chemical Co.
Huntington Laboratories, Inc.
Kalene Corp.
Lightfoot Co., Inc.
McDonald, B. F., Co.
Magnus Chemical Co., Inc.
Milburn Co.
Mione Mfg. Co.
Oakite Products, Inc.
Packwood, G. H., Mfg. Co.
Penetone Co.
Quickee Products, Inc.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Stepan Chemical Co.
Stover, H. W., Co.
Sugar Beet Prod. Co.
Vestal, Inc.
West Chemical Products, Inc.
Worrell-Consolidated Laboratories

Soap Dispensers

Banite Co.
Bradley Washfountain Co.
Brulin & Co., Inc.
Dameron Enterprises, Inc.
Dolge, C. B., Co.
Finnell System, Inc.
Hillyard Chemical Co.
Huntington Laboratories, Inc.
Kalene Corp.
Lightfoot Co., Inc.
McDonald, B. F., Co.
Mione Mfg. Co.
Packwood, G. H., Mfg. Co.
Quickee Products, Inc.
Rochester Safety Equipment, Co., Inc.
Searjeant Metal Products, Inc.
Stepan Chemical Co.
Sugar Beet Prod. Co.
Vestal, Inc.
West Chemical Products, Inc.

Soles, Shoe, Non-Slip

American Biltrite Rubber Co.
Bearfoot Sole Co., Inc.
Cambridge Rubber Co.
DuPont, E. I. de Nemours & Co., Inc.
Emerson, J. H., Co.
Geo-Cord Rubber Co.
Quabaug Rubber Co.
Rochester Safety Equip. Co., Inc.

Solvents, Cleaning

Associated Just Distributors, Inc.
Brulin & Co., Inc.
Curran Corp.
Dameron Enterprises, Inc.
Daubert Chemical Corp.
Diversey Corp.
Dow Chemical Co.
DuPont, E. I. de Nemours & Co., Inc.
Fine Organics, Inc.
Finnell System, Inc.
Magnus Chemical Co., Inc.
Miracle Adhesives Corp.
Moore, John B., Corp.
National Disinfectant Co.
Oakite Products, Inc.
Packwood, G. H., Mfg. Co.
Penetone Co.
Practical Mfg. Co.
Rochester Safety Equip. Co., Inc.
Teet, Inc.
Turco Products, Inc.
West Chemical Products, Inc.

Sound Absorbers

Allied Witan Co.
Hansson, Elof, Inc.
Industrial Acoustics Co., Inc.
United States Gypsum Co.

See directory of Safety Equipment Sources for addresses.

Sound Analyzers
McDonald, B. F., Co.
Mine Safety Appliances Co.
Scott, H. H. Inc.

Sound Control Panels
Rysdon Products Co., Noise Control Div.

Sound Protectors
American Optical Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.

Spectacles, Industrial
Boyer-Campbell Co.
Dockson Corp.
Fendall Company
General Scientific Equip. Co.
Glendale Optical Co., Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Olympic Glove Co., Inc.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Sellstrom Mfg. Co.
Standard Glove Co.
Titmus Optical Co.
United States Safety Service Co.
Welsh Mfg. Co.
Willson Products Div.

Sprinkler Systems
Central Automatic Sprinkler Co.
Central Safety Equip. Co.
Engineering Corp. of America
Fyr-Fyter Co.
Grinnell Co.
Notifier Corp.
Rockwood Sprinkler Co.

Stain Remover, Floor
Associated Just Distributors, Inc.
Huntington Laboratories, Inc.
Magnus Chemical Co., Inc.
Masury-Young Co.
Moore, John B., Corp.
Quickee Products, Inc.

Stair Treads, Safety
Alan Wood Steel Co.
Aluminum Co. of America
American Abrasive Metals Co.
American Mason Safety Tread Co.
Borden Metal Products Co.
Boyer-Campbell Co.
Brabrook, A. N., Inc.
Bustin Steel Products, Inc.
Globe Co.
Joslin, Herbert A., Co.
Klemp Metal Grating Corp.
Melflex Products Co., Inc.
Moor, D. W., Co.
Quabaug Rubber Co.
Reliance Steel Prod. Co.
Rochester Safety Equip. Co., Inc.
Superior Rubber Mfg. Co.
United States Rubber Co.

Stairways
American Abrasive Metals Co.
Ballymore Co.
Globe Co.

Standards and Signs, Accident Prevention, Portable
Boyer-Campbell Co.
Brady, W. H., Co.
Industrial Prod. Co.
New Jersey Safety Equip. Co.
Prairie State Prod. Co.
Ready Made Sign Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety Equip. Co., Inc.
Safety First Supply Co.
Sohl Company
Standard Safety Equipment Co.
Stonehouse Signs, Inc.
Tedcar Products Co.

Static Ground Device, Personnel
Hewson Co., Inc.
Legge, Walter G., Co., Inc.

Steel Toes, Safety Shoes
Iron Age Safety Shoe Div., H. Childs & Co., Inc.
New Jersey Safety Equip. Co.
Reece Wooden Sole Shoe Co.
Rochester Safety Equip. Co., Inc.
Safety Box Toe Co.
Snyder, M. L., & Son, Inc.

Sterilizing Equipment
Fisher Scientific Co.
Karel First Aid Supply Co.
Rochester Safety Equip. Co., Inc.
Vacuum Can Co.

Stools, Insulating
Chicago Hardware Foundry Co.
Salisbury, W. H., & Co.

Straps, Safety
Bashlin, W. M., Co.
Buhrke, R. H., Co.
Gebhardt, A. L., Co.
Industrial Safety Belt Co.
McDonald, B. F., Co.
Mathias Klein & Sons
Miller Equip. Co., Inc.
Mine Safety Appliances Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Standard Glove Co.

Stretcher Kits and Cases
Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
Halperin, A. E. Co., Inc.
Junkin Safety Appliance Co., Inc.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Medical Supply Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Osborn Mfg. Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Sarole Inc.
Searjeant Metal Products, Inc.
Seco Safety Products Co.
Smith, A., & Son, Inc.
Standard Safety Equipment Co.
Washington Prod. Co.

Stretchers
Bomgardner Mfg. Co.
Bullard, E. D., Co.
Davis Emergency Equip. Co., Inc.
Frank Mfg. Co., Inc.
General Scientific Equip. Co.
Halperin, A. E., Co., Inc.
Junkin Safety Appliance Co., Inc.
Karel First Aid Supply Co.
McDonald, B. F., Co.
Medical Supply Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Osborn Mfg. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Sarole Inc.
Searjeant Metal Products, Inc.
Smith, A., & Son, Inc.
Standard Glove Co.
Standard Safety Equipment Co.
Washington Prod. Co.

Sun Glasses
American Optical Co.
Bausch & Lomb Optical Co.
Glendale Optical Co., Inc.
Kimball Safety Prod. Co.
Pioneer Scientific Corp.
Rochester Safety Equip. Co., Inc.
Titmus Optical Co.
United States Safety Service Co.
Watchemoket Optical Co., Inc.
Willson Products Div.

Sweat Bands
American Allsafe Co., Inc.
American Industrial Safety Equip. Co., Inc.
American Optical Co.
Associated Bag & Apron Co.
Boyer-Campbell Co.
Bullard, E. D., Co.
Fibre-Metal Products Co.
General Bandages, Inc.
General Scientific Equip. Co.
Glendale Optical Co., Inc.
Halperin, A. E., Co., Inc.
Industrial Prod. Co.
Karel First Aid Supply Co.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Plasco Safety Prod. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Sellstrom Mfg. Co.
Standard Glove Co.
Standard Safety Equipment Co.

Sweepers, for Roads, Parking Lots
Clarke Sanding Machine Co.
Handling Devices Co., Inc.
New Jersey Safety Equip. Co.

Sweeping Compounds
Associated Just Distributors, Inc.
Canfield Oil Co.
Hillyard Chemical Co.
Huntington Laboratories, Inc.
Legge, Walter G., Co., Inc.
Scientific Industrial Supply Co.

Swing Stage
Aluminum Safety Prod. Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

Switches, Dis Interlock
Micro Switch, Div. of Minneapolis-Honeywell Reg. Co.

Syphons, Acid
Fisher Scientific Co.
General Scientific Equip. Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

T

Tables, Luncheon
Chicago Hardware Foundry Co.
Karel First Aid Supply Co.

Tags, Accident Prevention
Boyer-Campbell Co.
Brady, W. H., Co.
General Scientific Equip. Co.
Industrial Prod. Co.
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
Prairie State Prod. Co.
Ready Made Sign Co., Inc.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co
Sohl Company
Standard Safety Equipment Co.
Stonehouse Signs, Inc.

Tarpaulins, Plastic
Plastimayd Prod. Corp.

Tension Stringing Equipment
Petersen Engineering Co., Inc.

Tents, Plastic
Plastimayd Prod. Corp.

Tire Chain and Accessories
American Chain Div., American Chain & Cable Co., Inc.
Columbus McKinnon Chain Corp.

Toe Guards
Ellwood Safety Appliance Co.
Industrial Gloves Co.
Lehigh Safety Shoe Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
New Jersey Safety Equip. Co.
Pulmosan Safety Equip. Corp.
Reece Wooden Sole Shoe Co.
Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
Safety First Supply Co.
Searjeant Metal Products, Inc.
Standard Safety Equipment Co.

Tool Holsters (Tool Holder)
Bashlin, W. M., Co.
Buhrke, R. H., Co.
Industrial Safety Belt Co.
Mathias Klein & Sons
McDonald, B. F., Co.
Miller Equip. Co., Inc.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Standard Glove Co.

Tool Tester
Fendall Company
Standard Glove Co.

Tools, Linemen's
Bashlin, W. M., Co.
Mathias Klein & Sons
Miller Equipment Co., Inc.
Rochester Safety Equip. Co., Inc.

Tools, Marking
Cunningham, M. E., Co.

Tools, Safety
Beryllium Corp.
Custanite Corp.
DeWalt Div., American Machine & Foundry Co.
Frontier Bronze Corp.
Ingersoll-Rand Co.
Magline Inc.
Mathias Klein & Sons
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
New Plastic Corp.
Osborn Mfg. Co.
Pulmosan Safety Equip. Corp.
Rochester Safety Equip. Co., Inc.
Scientific Industrial Supply Co.
Searjeant Metal Products, Inc.
Standard Safety Equipment Co.
Tamco, Inc.
Tool & Mfg. Co., Inc.

Torches, Welding
Dockson Corp.
General Scientific Equip. Co.
Linde Co.
Rochester Safety Equip. Co., Inc.

Tourniquet, Pneumatic
Sohl Company

Towels, Paper
Rochester Safety Equip. Co., Inc.
Scientific Industrial Supply Co.
Scott Paper Co.
West Chemical Products, Inc.

Treads, Floor
Aluminum Co. of America
American Abrasive Metals Co.
American Mason Safety Tread Co.
Bustin Steel Products, Inc.
Globe Company
Reliance Steel Prod. Co.

Trench Covers
American Abrasive Metals Co.

Trestles, Extension
Bil-Jax, Inc.

To locate Advertisements, see Advertisers' Index.

Trolley Conveyors
Link-Belt Co.

Trolley Guard Hanger
Link-Belt Co.
Mine Safety Appliances Co.

Trophies
Award Incentives, Inc.
House of Williams
Metal Arts Co., Inc.
Williams Jewelry & Mfg. Co.

Trucks, Portable Hand
Industrial Prod. Co.
Magline Inc.
New Jersey Safety Equip. Co.
Raymond Corp.
Rochester Safety Equip. Co., Inc.
Rol-Away Truck Mfg. Co., Inc.
West Bend Equip. Corp.

Turbines, Steam
Coppus Engineering Corp.
Pyle-National Co.

U

Under Floor Conveyors
Link-Belt Co.

Uniforms, Industrial
Advance Glove Mfg. Co.
American Allsafe Co., Inc.
Industrial Gloves Co.
Institute of Industrial Launderers
Kimball Safety Prod. Co.
Rochester Safety Equip. Co., Inc.
Scientific Industrial Supply Co.
Setlow, M., & Son, Inc.
Wheeler Protective Apparel, Inc.

V

Vacuum Cleaners, Industrial
Brulin & Co., Inc.
Clarke Sanding Machine Co.
Craftools, Inc.
Dolge, C. B., Co.
Doyle Vacuum Cleaner Co.
Finnell System, Inc.
Handling Devices Co., Inc.
Hillyard Chemical Co.
Holt Mfg. Co.
Kent Co., Inc.
Masury-Young Co.
M-M-A, Inc.
Multi-Clean Prod., Inc.
Nobles Engineering & Mfg. Co.
Rochester Safety Equip. Co., Inc.
Spencer Turbine Co.
United Floor Machine Co.
United States Hoffman Machinery Corp.
Worrell-Consolidated Laboratories

Vacuum Cleaners, Industrial, Explosion Proof
Hild Floor Machine Co., Inc.

Valves, Air Blow
Schrader's, A., Son, Div. of Scovill Mfg. Co., Inc.
United States Hoffman Machinery Corp.

Valves, Gate
R-P&C Valve Div., American Chain & Cable Co., Inc.
Seco Safety Products Co.

Valves, Oxygen
Davis Emergency Equip. Co., Inc.
Grinnell Co.
Linde Co.
Rockwood Sprinkler Co.
Safety First Supply Co.
Schrader's, A., Son, Div. of Scovill Mfg. Co., Inc.

Valves, Safety
Coppus Engineering Corp.
Industrial Flow Controls Co.
Protectoseal Co.
Rochester Safety Equip. Co., Inc.
Rockwood Sprinkler Co.
Safety First Supply Co.
Speakman Co.
Watts Regulator Co.

Valves, Steam
Powers Regulator Co.
Rockwood Sprinkler Co.
R-P&C Valve Div., American Chain & Cable Co., Inc.

Valve Wheel Wrench, Spark Proof
Rochester Safety Equip. Co., Inc.

Vending Machines, Sanitary Napkins
Halperin, A. E., Co., Inc.
Rochester Safety Equip. Co., Inc.
West Chemical Products, Inc.

Ventilating Devices, Portable
American Machine & Metals, Inc., DeBothezat Fans Div.
Coppus Engineering Corp.
Engineering Corp. of America
McDonald, B. F., Co.
Mine Safety Appliances Co.
Standard Safety Equipment Co.
Wasco Products, Inc.

Ventilating Equipment
American Machine & Metals, Inc. DeBothezat Fans Div.
Buffalo Forge Co.
Coppus Engineering Corp.
Engineering Corp. of America
Mine Safety Appliances Co.
Robbins & Myers, Inc.
Swartwout Co.
Wasco Products, Inc.
Westinghouse Electric Corp.

Vest, Protective
Advance Glove Mfg. Co.
Holcomb Safety Products Co.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Wheeler Protective Apparel, Inc.

Vision Testing Equipment
American Optical Co.
Bausch & Lomb Optical Co.
Karel First Aid Supply Co.
Keystone View Co.
Titmus Optical Co.

Visual Aids
Bausch & Lomb Optical Co.
Canisteo Sign Mfg. Co., Inc.
DuKane Corp.
Embossograf Corp. of America
Keystone View Co.
National Safety Council
Porto-Clinic Instruments, Inc.
Training Aids
United World Films, Inc.
Whitney, L. A., Associates, Inc.

W

Walk-Way Surfacing, Non-Slip
American Abrasive Metals Co.
Brabrook, A. N., Inc.
Custanite Corp.
Frost Paint & Oil Corp.
Joslin, Herbert A., Co.
Kelley Paint Co.
Legge, Walter G., Co., Inc.
Masury-Young Co.
McDonald, B. F., Co.
Moor, D. W., Co.
Reliance Steel Prod. Co.
Rochester Safety Equip. Co., Inc.

Wall Grips
Cleveland Ladder Co., Inc.
Rochester Safety Equip. Co., Inc.

Wash-Away Bottle
Industrial Prod. Co.
Karel First Aid Supply Co.
Pulmosan Safety Equip. Corp.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.

Washers, Fire Hose
Circul-Air Corp.

Washers, Safety for Grinding Wheel
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.
Standard Safety Equipment Co.

Washfountain
Bradley Washfountain Co.
Karel First Aid Supply Co.
Rochester Safety Equip Co., Inc.

Washroom Equipment, Industrial
Bradley Washfountain Co.
Chicago Hardware Foundry Co.
Onox, Inc.
Packwood, G. H., Mfg. Co.
Rochester Safety Equip. Co., Inc.
Scott Paper Co.
Speakman Co.
West Chemical Products, Inc.

Washstation, Waterless
Dameron Enterprises, Inc.
Packwood, G. H., Mfg. Co.
Rochester Safety Equip Co., Inc.

Watchmen's Clock Systems
American District Telegraph Co.
Chicago Watchclock
Detex Watchclock Corp.
Snyder, M. L., & Son, Inc.

Water Carrier
Dixie Cup Div., American Can Co.
Plax Corp.
Rochester Safety Equip. Co., Inc.

Water Coolers
Rochester Safety Equip. Co., Inc.
Taylor, Halsey W., Co.

Water Coolers, Explosion Proof
Haws Drinking Faucet Co.

Wax Applicators, Floor
Associated Just Distributors, Inc.
Brulin & Co., Inc.
Dameron Enterprises, Inc.
Finnell System, Inc.
Fyrepel Prod. Inc.
Hillyard Chemical Co.
Huntington Laboratories, Inc.
Johnson, S. C., & Son, Inc.
Masury-Young Co.
West Chemical Products, Inc.
Worrell-Consolidated Laboratories

Wax, Floor
Tect, Inc.

Weed Killers
U. S. Borax & Chemical Corp., Pacific Coast Borax Co. Div.

Welder's Protective Equipment
Acme Protection Equip. Co.
Advance Glove Mfg. Co.
Aljay Mfg. Co. Inc.
Allied Glove Corp.
American Industrial Safety Equip. Co., Inc.
American Optical Co.
Dockson Corp.
Dunn Products
Fibre-Metal Prod. Co.
Frommelt Industries
General Scientific Equip. Co.
Holcomb Safety Garment Co.
Industrial Gloves Co.
Industrial Prod. Co.
Jackson Products
Kennedy-Ingalls, Inc.
Kimball Safety Prod. Co.
McDonald, B. F., Co.
Mine Safety Appliances Co.
Olympic Glove Co., Inc.
Plasco Safety Prod. Co.
Pulmosan Safety Equip. Corp.
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Rochester Safety Equip. Co., Inc.
Safety Clothing & Equip. Co.
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Searjeant Metal Products, Inc.
Sellstrom Mfg. Co.
Snyder, M. L., & Son, Inc.
Standard Safety Equipment Co.
Welsh Mfg. Co.
Wheeler Protective Apparel, Inc.
Willson Products Div.

Wetting Agent for Fire Fighting
Central Safety Equip. Co.
Fyr-Fyter Co.
Houghton, E. F., & Co.
National Foam System, Inc.
Rochester Safety Equip. Co., Inc.
Rockwood Sprinkler Co.
Tect, Inc.

Wheel Blocks, Trucks
Calumet Steel Castings Corp.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.

Wiping Towels, Industrial
Karel First Aid Supply Co.
Rochester Safety Equip. Co., Inc.
Scientific Industrial Supply Co.
Scott Paper Co.

Wire Rope Fittings
American Chain & Cable Co., Inc.
American Hoist & Derrick Co.
Bashlin, W. M., Co.
Bethlehem Steel Co.
Calumet Steel Castings Corp.
Canton Mfg. Co.
Jones & Laughlin Steel Corp.
Lowery Brothers, Inc.
Macwhyte Co.
Newco Mfg. Co., Inc.
Roebling's, John A., Sons Corp.
Union Wire Rope Corp.

Workstands, Elevating, Portable and Stationary
Cotterman, I. D.
Economy Engineering Co.
Hamilton Tool Co.
Traffic Equip. Corp.
West Bend Equip. Corp.

Wrenches, Hopper Car
General Scientific Equip. Co.
Industrial Prod. Co.
New Jersey Safety Equip. Co.
Safety First Supply Co.
Standard Safety Equipment Co.

Wrenches, Non-Ferrous Metal
Ampco Metal, Inc.
Beryllium Corp.
Frontier Bronze Corp.
McDonald, B. F., Co.
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Scientific Industrial Supply Co.
Standard Safety Equipment Co.

Wrench, Spanner
New Jersey Safety Equip. Co.
Rochester Safety Equip. Co., Inc.
Safety First Supply Co.

See directory of Safety Equipment Sources for addresses.

advertisers' index

	Page No.
Adair, Robin W., Co.	174
Acme Protection Equipment Co.	129
Advance Glove Mfg. Co.	178
Acoustical Engineering Corp.	81
Alan Wood Steel Co.	21
Aljay Mfg. Co.	173
Aluminum Safety Products, Inc.	44
American Abrasive Metals, Inc.	24
American Biltrite Rubber Co.	147
American Chain & Cable Co., Inc.	185
American Industrial Safety Equip. Co.	128
American LaFrance Corp.	239
American Optical Co.	B.C.
American Tel. & Tel. Co.	267
Ansul Chemical Co.	219
Arabian American Oil Co.	276
Atlas Industrial Corp.	46
Award Incentives	274
Ayerst Laboratories	73
Babcock, W. W., Co.	32
Bailey, William M., Co.	204
Ballymore Co.	37
Bashlin, W. M., Co.	167
Bausch & Lomb Optical Co.	108-109
Bea-foot Sole Co., Inc.	151
Beltone Hearing Aid Co.	83
Benson & Associates	70
Bethlehem Steel Co.	193
Blackmer Pump Co.	238
Brabrook, A. N., Co.	26
Bradley Washfountain Co.	58
Brady, W. H., Co.	276
Breck, John H., Inc.	57
Brett-Guard Co.	213
Bronson Shoe Co.	178
Brossard, Lester L., Co.	23
Buhrke, R. H., Co.	169
Bullard, E. D., Co.	94-95-252
Calumet Steel Castings Corp.	197
Cambridge Rubber Co.	165
Charleston Rubber Co.	166-170
Chemical Corp.	67
Chic Maid Hat Mfg. Co., Inc.	132
Chicago Eye Shield Co.	104-105-I.B.C.
Chicago Hardware Foundry Co.	26-76
Chicago Watchclock Co.	243
Colorado Fuel & Iron Corp.	194
Conductive Hospital Accessories Corp.	23
Coppus Engineering Corp.	63
Cotterman, I. D.	46
Cover, H. S.	123
Crouse Hinds Co.	229
Cunningham, M. E., Co.	209
Dameron Enterprises, Inc.	62
Davenport, A. C., & Son, Inc.	272
Davis Emergency Equip. Co., Inc.	251
Detex Watchclock Corp.	241
Dillon, W. C. & Co., Inc.	196
Dockson Corporation	125
Dow-Chemical Co.	221
Dow Corning Corp.	102-103
Dri-Rite Co.	46
DuPont, E. I., de Nemours & Co., Inc.	231
Eagle-Picher Co.	43
Economy Engineering Co.	36
Ellwood Safety Appliance Co.	175
Emerson, J. H., Co.	254
Employers Mutuals of Wausau	265
Ericson Mfg. Co.	212
Exide Industrial Div., Electric Storage Battery Co.	232
Falcon Alarm Co., Inc.	244
Federal Flooring Co.	23
Federal Sign & Signal Corp.	240
Fendall Company	106
Fibre-Metal Products Co.	119
Fine Organics, Inc.	59
Finnell System, Inc.	28
Flintkote Co.	22
Frommelt Industries	173
Frontier Bronze Corp.	210
Frost Paint & Oil Co.	45
General Bandages, Inc.	257
General Split Corp.	177
Gets-A-Lite Co.	25
Globe Co.	24
Goodall Rubber Co.	155
Grinnell Co., Inc.	233
Gro-Cord Rubber Co.	153
Halperin, A. E., Co.	258
Hansson, Elof, Inc.	90
Haws Drinking Faucet Co.	64
Hild Floor Machine Co.	31
Holcomb Safety Garment Co.	165
Holt Mfg. Co.	32
Hood Rubber Co.	158
Houghton, E. F., Co.	225
House of Williams	273
Huntington Laboratories, Inc.	36
Hygiene Research, Inc.	66-68
Hy-Test Div., Intern'l Shoe Co.	142-143
Industrial Acoustics Co.	89
Industrial Gloves Co.	162
Industrial Products Co.	196
Iron Age Div., H. Childs & Co.	144-145
Jackson Products, Air Reduction Sales Co.	127
Johnson Ladder Shoe Co.	42
Johnson-Williams, Inc.	236
Jomac, Inc.	164
Jones & Co.	101
Junkin Safety Appliances Co., Inc.	212-213-256
Justrite Mfg. Co.	242
Kennedy-Ingalls, Co.	131
Kensico Mfg. Co.	196
Kidde, Walter, & Co., Inc.	237
Kimball Safety Products Co.	121
Kip, Inc.	75
Legge, Walter G., Co., Inc.	35
Lehigh Safety Shoe Co.	136-137
Lensclean, Inc.	107
Liberty Protective Leathers, Inc.	171
Lightfoot Co., Inc.	89
Littell, F. J., Machine Co.	214
Lowery Brothers, Inc.	189
Macwhyte Company	180
Magnesium Co. of America	198
Maico Co.	85
McAn, Thom, Safety Shoe Div.	138-139
McDonald, B. F., Co.	132
Medical Supply Co.	246
Merrill Brothers	198
Miller Equipment Co., Inc.	176
Mine Safety Appliances Co.	I.F.C.
Minnesota Mining & Mfg. Co.	38-163
Modern Machine Tool Co.	211
Morland Assoc.	74
Morrison-Pelsue Co.	76
Morse Mfg. Co., Inc.	197
Morrison Products, Inc.	210
Morton Salt Co.	51
National Disinfectant Co.	234
National Safety Council	277-278-279-280
New Jersey Safety Equipment Co.	178
Newco Mfg. Co., Inc.	191
Onox, Inc.	65
Osborn Mfg. Co.	258
Pac-Kit Company	253
Packwood, G. H., Mfg. Co.	53
Patent Scaffolding Co., Inc.	40-41
Peterson Engineering Co.	190
Pioneer Rubber Co.	172
Pittsburgh Plate Glass Co.	33
Positive Safety Mfg. Co.	211
Practical Mfg. Co.	42
Prairie State Products Co.	274
Pulmosan Safety Equipment Corp.	117
Ready Made Sign Co., Inc.	271
Record Industrial Co.	157
Reece Wooden Sole Shoe Co.	177-257
Reinhold Publishing Corp.	270
Re-Mar Products Corp.	174
Riegel Textile Corp.	148
Rochester Safety Equipment Co.	209
Rockwood Sprinkler Co.	222-223
Rose Mfg. Co.	38
Ruemelin Mfg. Co.	75
Safeguard Mfg. Co.	214
Safety First Products Corp.	235
Safety Box Toe Co.	141
Safety First Supply Co.	268
Safety Tower Ladder Co.	46
Salisbury, W. H., & Co.	159
Schrader's, A., Son	203
Scott Aviation Corp.	130
Sellstrom Mfg. Co.	115
Silicone Paper Co. of America, Inc.	99
Silver, Fred & Co.	25
Singer Glove Mfg. Co.	178
Standard Industrial Products Co.	244
Standard Safety Equipment Co.	60-124-126-128-131-168-171-208
Standard Signs, Inc.	272-273
Stepan Chemical Co.	56
Stephenson Corp.	256
Stonehouse Signs, Inc.	269
Surgical Mechanical Research, Inc.	90
Taylor, Halsey W., Co.	72
Taylor, S. G., Chain Co.	195
Tect, Inc.	71
Tokheim Corp.	230
Training Aids	276
Union Wire Rope Corp.	187
U. S. Borax & Chemical Corp., Pacific Coast Co. Div.	227
U. S. Envelope Co.	74
U. S. Safety Service Co.	113
U. S. Steel Co.	16
U. S. Treasury Dept.	34
Vacuum Can Co.	73
Vestal, Inc.	54-55
Wagner Sign Service Inc.	275
Washington Products Co.	255
Watchemoket Optical Co., Inc.	97
West Chemical Co.	61
Wheeler Protective Apparel, Inc.	161
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp.	194
Wiesman Mfg. Co.	212
Wilder Mfg. Co.	213
Wilkins Co., Inc.	110-111
Williams Jewelry & Mfg. Co.	268
Worklon, Inc.	175
Wyandotte Chemicals Corp.	39
Zenith Radio Corp.	87

see directory of safety equipment sources, pages 282-315

see classified safety product index, pages 316-333

Want More Information?

. . . the Reader Service postcard will get it for you FAST!

Here's how it works—

Printed below are two identical Reader Service postcards — the bottom one for your use; the top one for later readers of this issue. The numbers listed on each card are keyed to products advertised. Just circle the items you want to know more about, and we will ask the manufacturer to send you full information without obligation. Both cards are perforated for easy removal and no postage is required.

Advertised Products

—feature equipment and services that will help you solve accident problems in your plant. Instead of making a "mental note," make sure you get full information by sending in the card. If no item number appears with an ad, it will be found on the opposite page, next to the arrow. Cover position ads are shown on the cards as: IFC—inside front cover; IBC—inside back cover; BC—back cover.

IMPORTANT—Be sure to fill in your name, organization and address in the space provided on this side of the postcard.

Please send me more information on the items circled below: **MARCH 1958**

PRODUCTS ADVERTISED:

IFC	IBC	BC	1	2	3	4	5	6	7	8	9	10	11	12	13	14
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116
117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133
134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167
168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184
185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201
202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218
219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235
236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252

Please print your name and company in full—do not abbreviate

NAME.....

POSITION.....

COMPANY.....

ADDRESS.....

CITY & STATE.....

Please send me more information on the items circled below: **MARCH 1958**

PRODUCTS ADVERTISED:

IFC	IBC	BC	1	2	3	4	5	6	7	8	9	10	11	12	13	14
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116
117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133
134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167
168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184
185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201
202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218
219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235
236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252

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NAME.....

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The advertising pages of the News

. . . your guide to products of importance and help to your plant safety program

Keep up-to-the-minute on all the latest advances in industrial safety products and services through the advertising pages and new safety equipment features in the NATIONAL SAFETY NEWS.

Should you want additional information or special consultation on your specific problems, don't hesitate to write to the manufacturers. They welcome your inquiries and will answer your questions without obligation.

Although the Council does not test or examine the products advertised or mentioned in the editorial features, staff engineers and technicians review all product information in an effort to determine that descriptions and performance claims are accurate. It should not be construed, however, that commercial products are approved or endorsed by the National Safety Council.

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Before you mail your Reader Service postcard . . . TAKE ANOTHER LOOK at the ADVERTISING PAGES

Make sure all the items you want to know more about are circled . . . check to make sure your name, organization, and address are printed on the reverse side of the postcard . . . THEN mail it today.

There's a CESCO Representative Nearby Ready to Give Me Fast Action On Any Safety Equipment Need

As a safety engineer, I expect two things from my safety equipment source—a complete line of all types of safety equipment and prompt delivery of my order. For years, CESCO has more than met these requirements on both counts. Their distributors are truly safety specialists in every sense of the word, who offer a well-engineered, top quality line of safety glasses, goggles, face shields, welding helmets, respirators, hoods—in fact all of my many safety equipment needs. Equally important, their distributors are located from coast to coast, ready to give expert safety equipment advice. Then, they back up their recommendations with fast delivery of my order. In most cases, I've found the CESCO distributor is able to fill my order from his own stock.

Make a note of the CESCO distributor nearest you and call him next time you have a safety equipment problem

BUY CESCO PRODUCTS FROM THESE SAFETY EQUIPMENT DISTRIBUTORS

ATLANTA, GA.
Guardian Safety Equipment Co.
1001 Euclid Avenue, N. E.

BATON ROUGE, LA.
Guardian Safety Equipment Co.
3615 Capitol Heights Ave.

BIRMINGHAM, ALA.
Industrial Safety Supply Co.
1727 Huntsville Road

BOSTON, MASS.
General Equipment Corporation
261 Franklin Street

BUFFALO, N. Y.
The Watson Company
1443 South Main Street

CHICAGO, ILL.
Universal Safety Equipment Co.
5115 West Diversey Avenue

CINCINNATI, OHIO
Williams & Co., Inc.
3231 Fredonia Avenue

CLEARWATER, FLORIDA
Cor-Mod Equipment Company
686 Palm Avenue, Belleair

CLEVELAND, OHIO
Williams & Co., Inc.
3700 Perkins Avenue

COLUMBUS, OHIO
Williams & Co., Inc.
980 Williams Avenue

DALLAS, TEXAS
Guardian Safety Equipment Co.
3570 Flaxley Drive

DETROIT, MICH.
Averill Equipment Company
19225 Conant Avenue

HOUSTON, TEXAS
Guardian Safety Equipment Co.
300 Sandman Street

KANSAS CITY, MO.
Safety, Incorporated
17½ East 31st Street

KNOXVILLE, TENN.
Safety Equipment Distributing Co.
632 West Main Avenue

LOS ANGELES, CALIF.
Guardian Safety Equipment Co.
7223 South Main Street

LOUISVILLE, KENTUCKY
Williams & Co., Inc.
1109 South Preston Street

MILWAUKEE, WIS.
Universal Safety Equipment Co.
3155 South Seventh Street

NEW YORK, N. Y.
(See ORANGE, N. J.)

ORANGE, N. J.
Guardian Safety Equipment Co.
400 South Jefferson Street
(New York-New Jersey Area)

PEORIA, ILL.
Standard Industrial Products Co.
920 North Garfield Avenue

PHILADELPHIA, PA.
Guardian Safety Equipment Co.
214 South 45th Street

PITTSBURGH, PA.
Williams & Co., Inc.
901 Pennsylvania Avenue

ST. LOUIS, MO.
Safety, Incorporated
2600 Olive Street

ST. PAUL, MINN.
Continental Safety Equipment, Inc.
1551 Selby Avenue

SALT LAKE CITY, UTAH
Universal Safety & Fire Equipment Co., 727 South West Temple

SAN MATEO, CALIF.
Guardian Safety Equipment Co.
220 East Third Avenue

SPOKANE, WASH.
Spokane Safety Appliance Co.
N. 219 Division Street

TOLEDO, OHIO
Williams & Co., Inc.
946 Kane Street

TULSA, OKLA.
Guardian Safety Equipment Co.
1742 South Main Street

MEXICO CITY, D. F.
Safety Equipment, S. A.
Sullivan No. 95

MONTREAL, CANADA
The Butler Optical Company, Ltd.
1520 Mountain Street

Circle Item No. IBC—Reader Service Card

Hand Protection for Welders

AO "Drednaut" Welders' Gloves and Mittens are

RIGHT ON HAND!

5C3013 GLOVE
Leather patch on back of hand gives added protection against sparks and molten metal. Thumb and first finger reinforced with leather patch. Additional reinforcing leather patch around thumb. Full gauntlet. Clute style. Overall length 14".

5CTX200 GLOVE
Gunn style 14" overall length. Flat double stitched seam at base of palm. One-piece back. Wing thumb. Lightweight for working ease.

5C5X163 GLOVE
Offers top resistance to heat on heaviest gas welding and heaviest amperage electric welding. One-piece back and palm. Welted at all vulnerable seams for extra protection. Heavy lining on back. Overall length 14".

3003 ONE-FINGER MITTEN
One-piece back and palm. Reinforcing leather strap around thumb crotch. Back of hand lined. 14" long. (Also available as No. 3004 as a full mitten.)

These Hand Protection products are made to the same high quality standards as American Optical Eye Protection equipment. They're RIGHT — in leather quality, thickness, length and construction. For American Optical gloves, only selected, specially chrome tanned cowhide splits are used that meet American Optical's rigid standards for maximum wear, heat-resistance, flexibility and comfort.

Gunn pattern models for heavy-duty welding and burning have a double thread sewed flat seam at base of palm . . . and for increased comfort, one-piece backs with heavy linings from wrist to finger tips. Wing thumb pattern reduces hand fatigue, increases glove life.

All gloves are bound at cuffs with cotton tape. Mittens while not *specially* chrome tanned are made of a heavier grade cowhide. Four of the ten products in the line are illustrated.

Always insist on
Trademarked Safety Products

American Optical
COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS
BRANCHES IN PRINCIPAL CITIES

Circle Item No. 8C—Reader Service Card